Notebook for

Year 11 Mathematics Course Book

NCEA 1

Level 6

NuLake Ltd
Innovative Publisher of Mathematics Texts

Chapter 1

Measurement

- measurement systems and metric unit conversion
- perimeter and circumference
- area and surface area
- volume of cuboids, prisms, cylinders, cones, pyramids and spheres
- capacity
- mass and combined units
- limits of accuracy
- rounding and understanding the effect of the accuracy of measurement on calculations.

This topic may contribute to the assessment of:

AS1.2 (91945) Explore mathematical problems that relate to life in Aotearoa New Zealand or the Pacific (Internal – 5 credits)

and build knowledge for

AS1.4 (91947) Demonstrate mathematical reasoning (External – 5 credits)

These exercises are from Page 4 of the Year 11 Mathematics Course Book and the answers are on Page 342.

From the Year 11 Mathematics Course Book change to the unit indicated in brackets.

1. **2.** **3.** **4.**

5. **6.** **7.** **8.**

9.

From the Year 11 Mathematics Course Book, calculate and express your answer in the most appropriate unit.

10. **11.** **12.** **13.**

14. **15.**

From the Year 11 Mathematics Course Book, change to the unit indicated in brackets. In questions **21.** to **24.** convert to either unit.

16. **17.** **18.** **19.**

20. **21.** **22.** **23.**

24.

These exercises are from Page 4 of the Year 11 Mathematics Course Book and the answers are on Page 342.

From the Year 11 Mathematics Course Book, identify the appropriate unit.

25. **26.**

27. **28.**

From the Year 11 Mathematics Course Book, solve the measurement problems.

29. **30.**

31. **32.**

33. **34.**

35. **36.**

37. **38.**

39. **40.**

These exercises are from Page 6 of the Year 11 Mathematics Course Book and the answers are on Page 342.

From the Year 11 Mathematics Course Book, give the limits of accuracy of the measurements given.

41. **42.** **43.**

44. **45.** **46.**

These exercises are from Page 6 of the Year 11 Mathematics Course Book and the answers are on Page 342.

From the Year 11 Mathematics Course Book, give the limits of accuracy of the measurements given.

47.

48.

49.

50.

51.

52.

53.

54.

55.

From the Year 11 Mathematics Course Book, give the largest error implied for the measurements.

56.

57.

58.

59.

60.

61.

62.

63.

64.

From the Year 11 Mathematics Course Book, give the limits of accuracy of the answer.

65.

66.

67.

68.

69.

70.

From the Year 11 Mathematics Course Book, give the limits of accuracy of the resulting rectangle.

71.

72.

73.

These exercises are from Page 7 of the Year 11 Mathematics Course Book and the answers are on Page 342.

From the Year 11 Mathematics Course Book, how many significant figures in each measurement?

74.

75.

76.

77.

78.

79.

80.

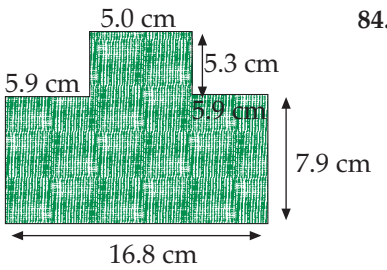
81.

82.

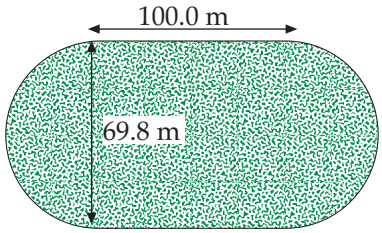
These exercises are from Page 9 of the Year 11 Mathematics Course Book and the answers are on Page 342.

From the Year 11 Mathematics Course Book, calculate the perimeter and round your answer appropriately.

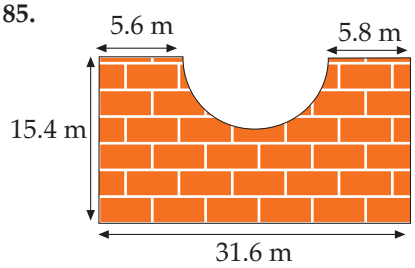
83.



84.



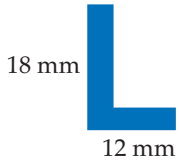
85.



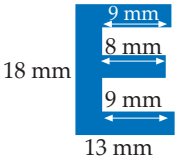
These exercises are from Page 9 of the Year 11 Mathematics Course Book and the answers are on Page 342.

From the Year 11 Mathematics Course Book, the letters are made from 4 mm strips, find the perimeter.

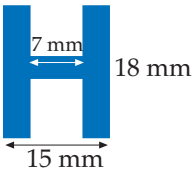
86.



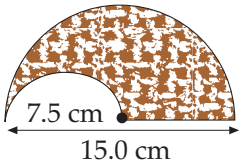
87.



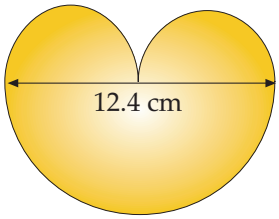
88.



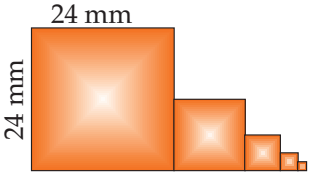
89. This shape is formed using 2 semicircles.



90. This shape is formed using 3 semicircles.

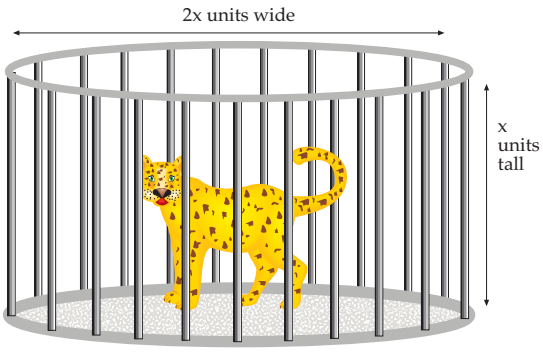


91. Each square is exactly half the dimensions of the preceding square.



From the Year 11 Mathematics Course Book, apply your knowledge of perimeters to solve the questions. Round your answer to the appropriate level of precision.

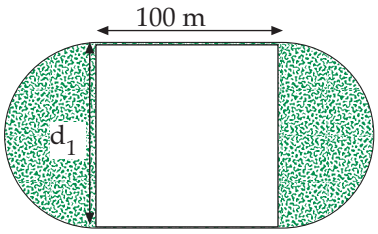
92.

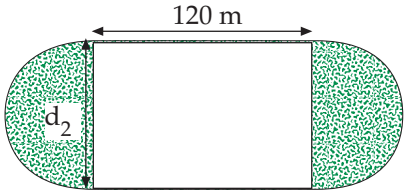


These exercises are from Page 10 of the Year 11 Mathematics Course Book and the answers are on Page 342 & 343.

From the Year 11 Mathematics Course Book, apply your knowledge of perimeters to solve the questions. Round your answer to the appropriate level of precision.

93.

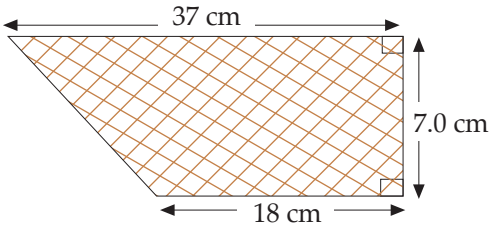




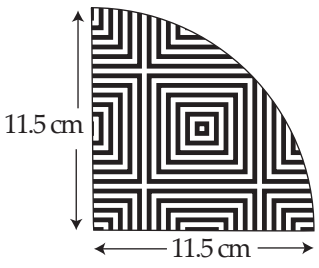
These exercises are from Page 12 of the Year 11 Mathematics Course Book and the answers are on Page xxx.

From the Year 11 Mathematics Course Book, calculate the area of the given figures.

94.



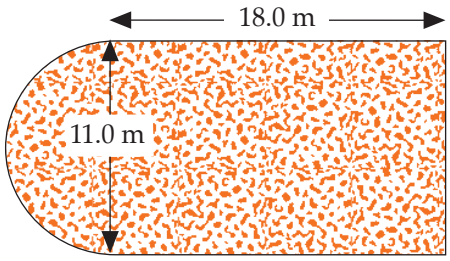
95.



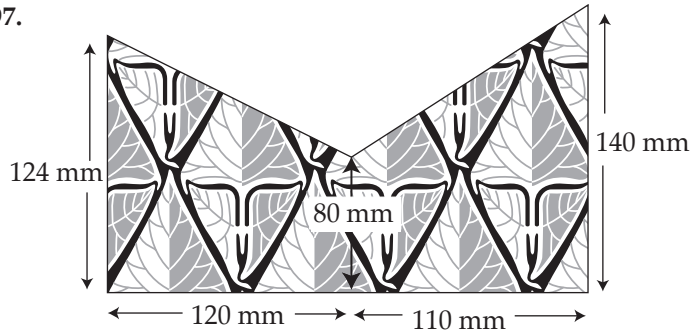
These exercises are from Page 12 of the Year 11 Mathematics Course Book and the answers are on Page 343.

From the Year 11 Mathematics Course Book, calculate the area of the given figures.

96.

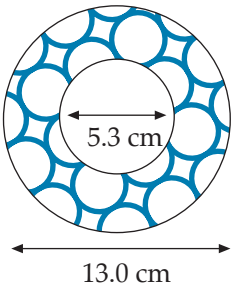


97.

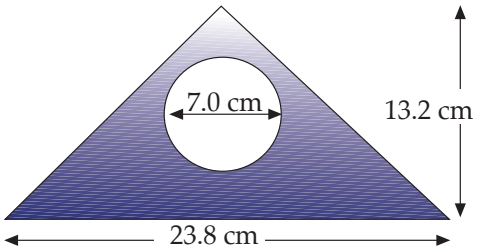


From the Year 11 Mathematics Course Book, calculate the shaded area of the given figures. Round your answer to the appropriate level of precision.

98.



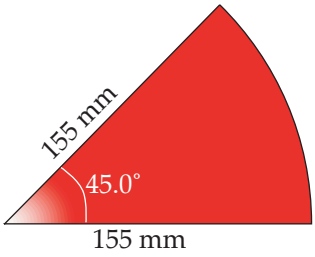
99.



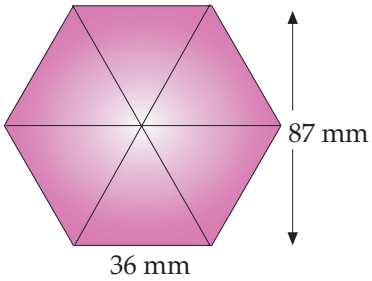
These exercises are from Page 12 of the Year 11 Mathematics Course Book and the answers are on Page 343.

From the Year 11 Mathematics Course Book, calculate the shaded area of the given figures. Round your answer to the appropriate level of precision.

100.

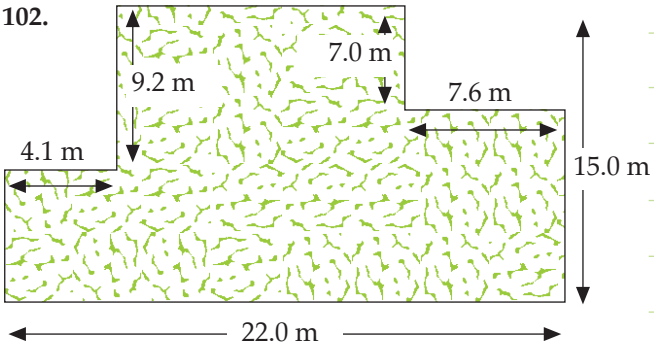


101.



From the Year 11 Mathematics Course Book, apply your knowledge of areas to solve the questions. Clearly explain all your calculations and round your answer to the appropriate level of precision.

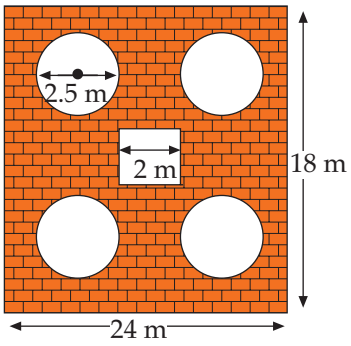
102.



These exercises are from Page 13 of the Year 11 Mathematics Course Book and the answers are on Page 343.

From the Year 11 Mathematics Course Book, apply your knowledge of areas to solve the questions. Clearly explain all your calculations and round your answer to the appropriate level of precision.

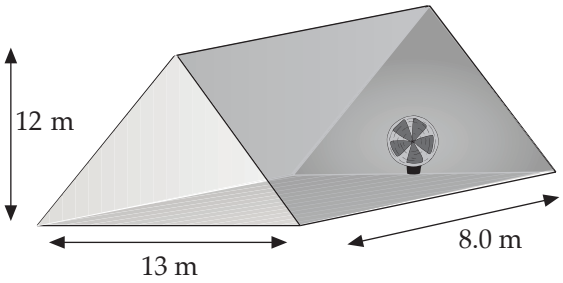
103.



These exercises are from Page 15 of the Year 11 Mathematics Course Book and the answers are on Page 343.

From the Year 11 Mathematics Course Book, solve the volume problems. Show ALL your working and clearly explain all your calculations.

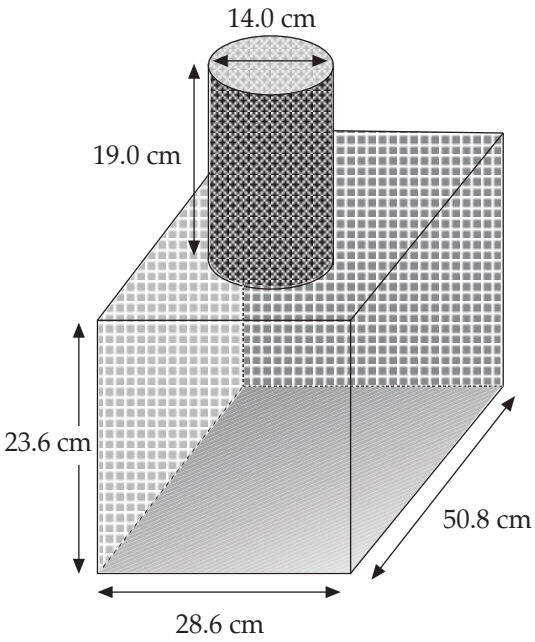
104.



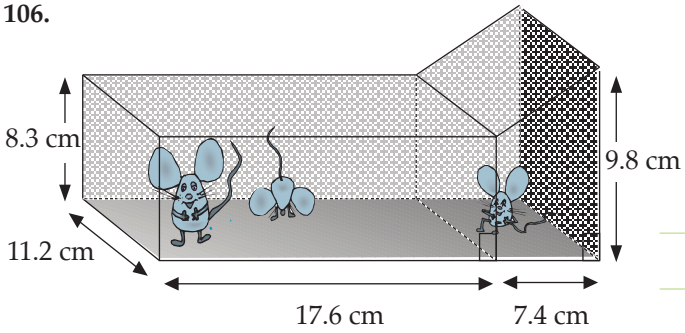
These exercises are from Page 15 of the Year 11 Mathematics Course Book and the answers are on Page 343.

From the Year 11 Mathematics Course Book, solve the volume problems. Show ALL your working and clearly explain all your calculations.

105.



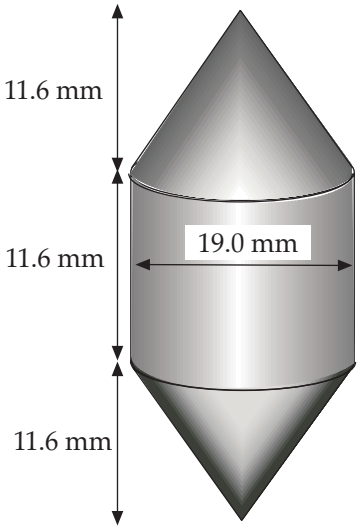
106.



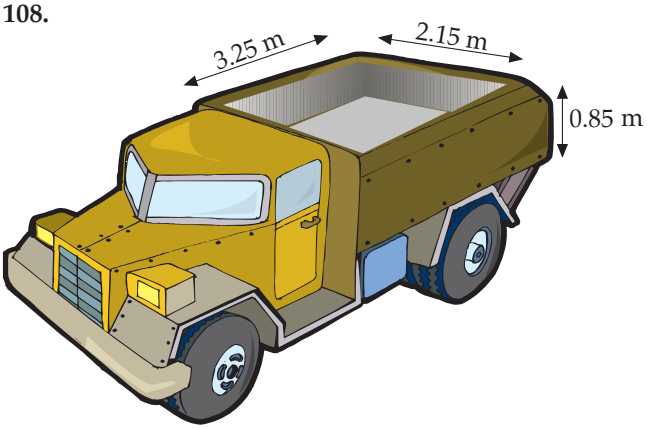
These exercises are from Page 16 of the Year 11 Mathematics Course Book and the answers are on Page 343.

From the Year 11 Mathematics Course Book, solve the volume problems. Show ALL your working and clearly explain all your calculations.

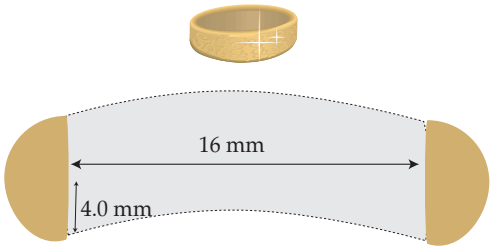
107.



108.



109.



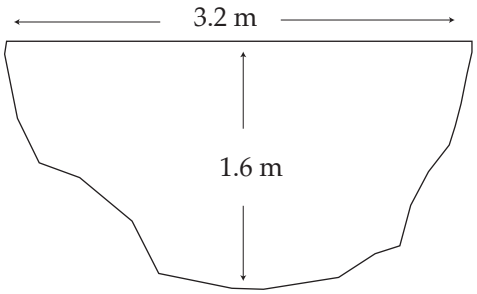
These exercises are from Page 16 of the Year 11 Mathematics Course Book and the answers are on Page 343.

From the Year 11 Mathematics Course Book, solve the volume problems. Show ALL your working and clearly explain all your calculations.

110.

These exercises are from Page 17 of the Year 11 Mathematics Course Book and the answers are on Page 343.

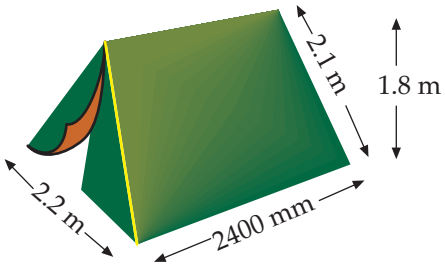
111.



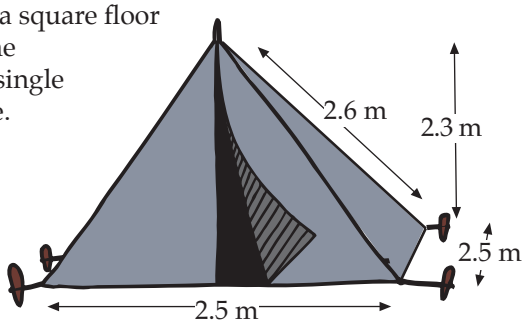
These exercises are from Page 17 of the Year 11 Mathematics Course Book and the answers are on Page 343.

112. From the Year 11 Mathematics Course Book, investigate which tent has the greatest volume. You will need to identify the model used for each tent and justify your final answer with calculations.

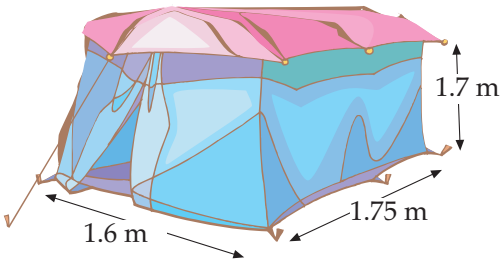
a) Tent 1.



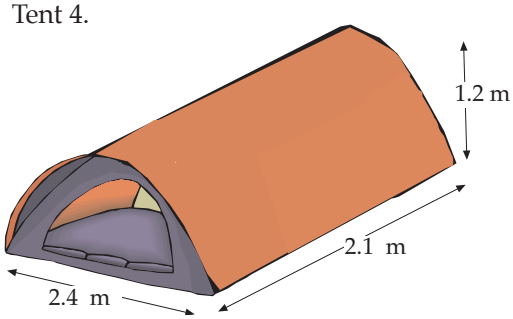
b) Tent 2 has a square floor rising to the top of the single centre pole.



c) Tent 3. Ignore the pitch of the roof.



d) Tent 4.

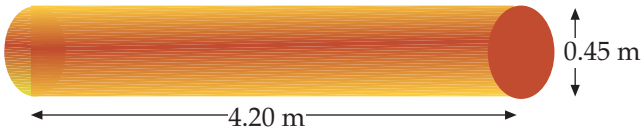


e) and f)

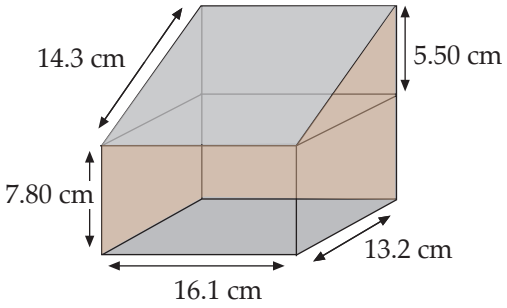
These exercises are from Page 19 of the Year 11 Mathematics Course Book and the answers are on Page 343.

From the Year 11 Mathematics Course Book, calculate the surface area of each figure.

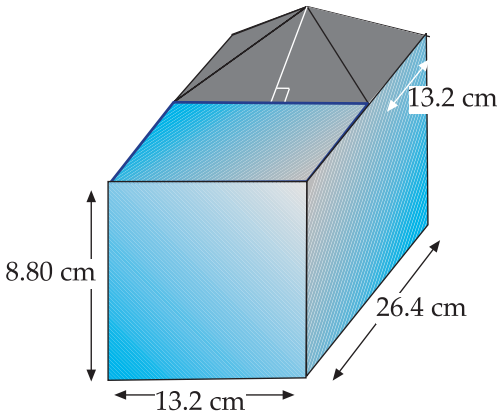
113.



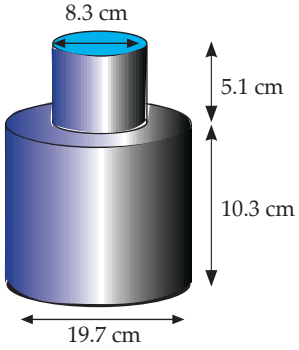
114.



115.



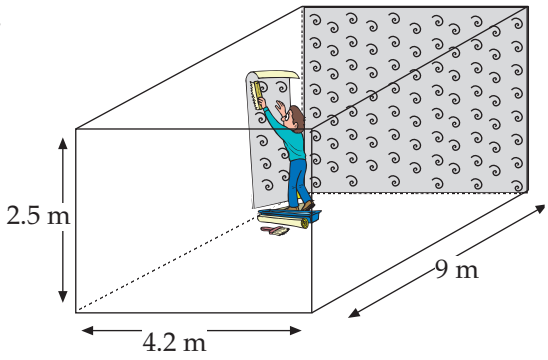
116.



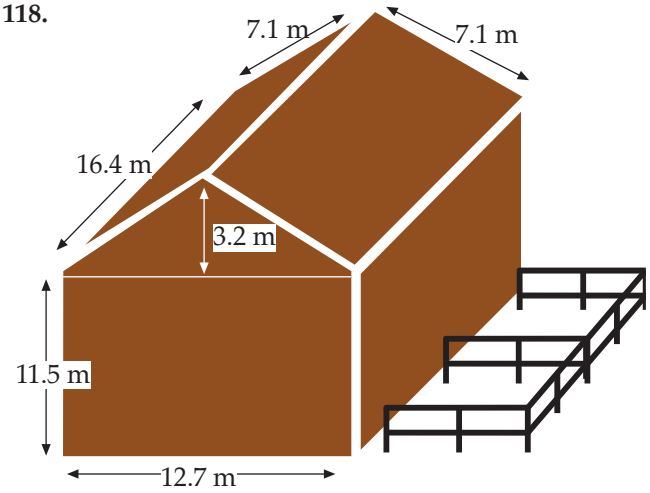
These exercises are from Page 20 of the Year 11 Mathematics Course Book and the answers are on Page 343.

From the Year 11 Mathematics Course Book, solve the surface area problems. Show your working and clearly explain all your calculations.

117.



118.

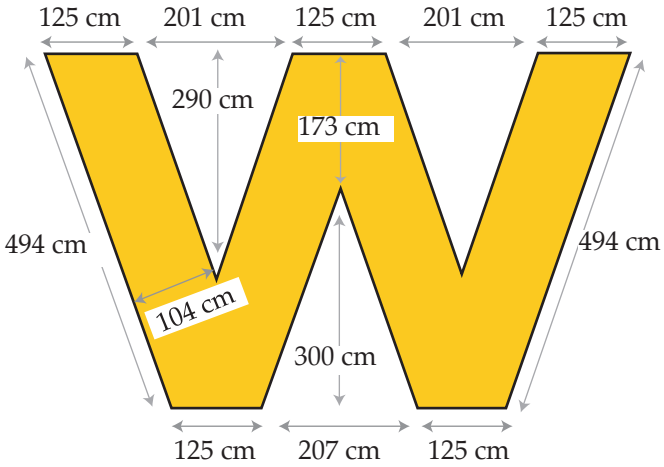


119.

These exercises are from Page 20 of the Year 11 Mathematics Course Book and the answers are on Page 343.

From the Year 11 Mathematics Course Book, solve the surface area problems. Show your working and clearly explain all your calculations.

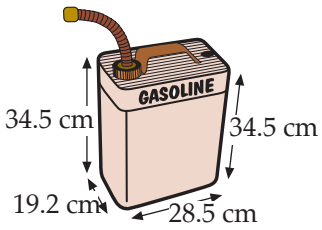
120. a) and b)



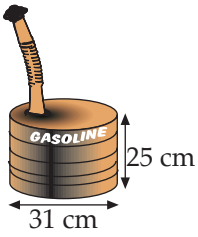
These exercises are from Page 22 of the Year 11 Mathematics Course Book and the answers are on Page xxx.

From the Year 11 Mathematics Course Book, use your knowledge to solve each problem.

121. a)



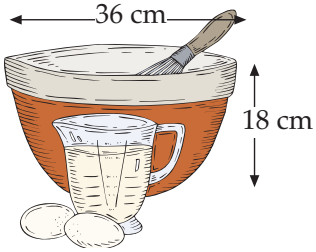
b)



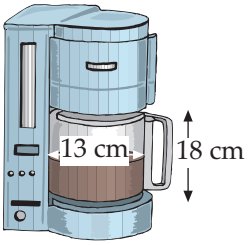
These exercises are from Page 22 of the Year 11 Mathematics Course Book and the answers are on Page 343 & 344.

From the Year 11 Mathematics Course Book, use your knowledge to solve each problem.

122.

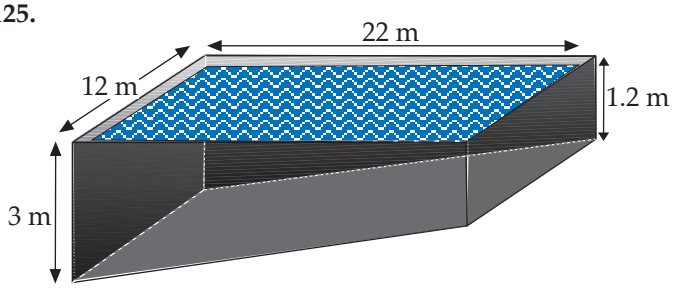


123.



124.

125.

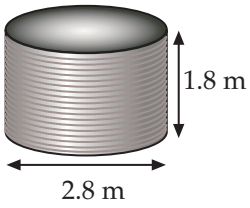


These exercises are from Page 23 of the Year 11 Mathematics Course Book and the answers are on Page 344.

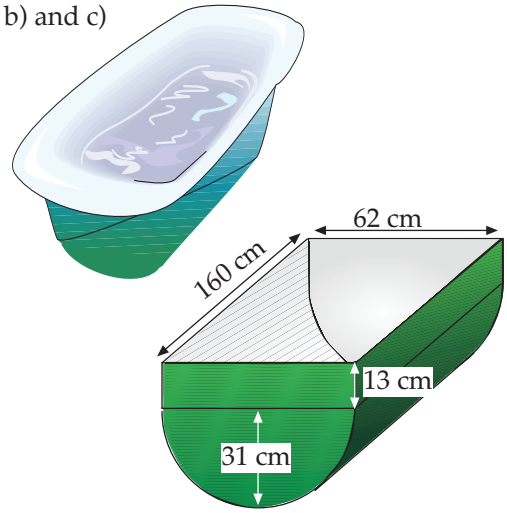
From the Year 11 Mathematics Course Book, use your knowledge to solve each problem.

126.

127. a), b), c) and d)



128. a), b) and c)



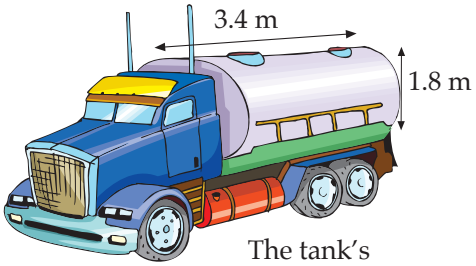
These exercises are from Page 24 of the Year 11 Mathematics Course Book and the answers are on Page 344.

From the Year 11 Mathematics Course Book, solve the measurement problems. Show ALL your working and clearly explain all your calculations.

129.

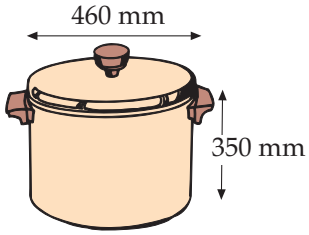
130.

131.

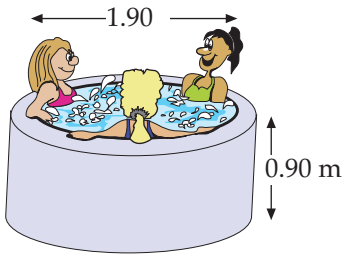


The tank's diameter is 1.8 m.

132.

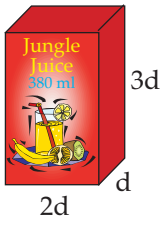


133.



No water is displaced by the people.

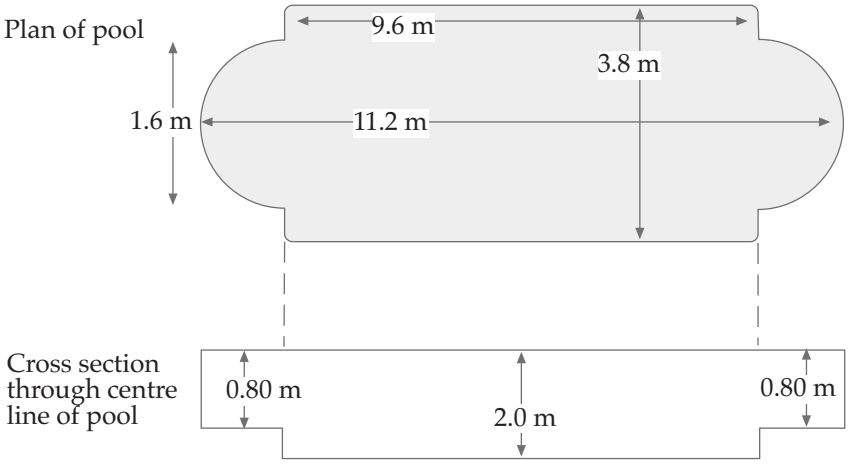
134.



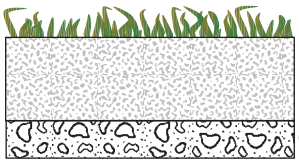
These exercises are from Page 25 of the Year 11 Mathematics Course Book and the answers are on Page 344.

135. a), b) and c)

From the Year 11 Mathematics Course Book, calculate the volume of this pool, you must calculate the volume of the two ends as well as the deeper section in the middle. The cross section shown is straight down the middle of the pool.



136. a), b) and c)



Chapter 2 Geometry

- angle properties of lines, polygons and intersecting and parallel lines
- angle properties of circles
- use properties of similar shapes in solving problems
- use trigonometric ratios and Pythagoras' theorem to find lengths and angles in 2 and 3 dimensions
- identify, describe, or use key features of transformations, including centres and angles of rotation, centres of enlargement, scale factors, lines of symmetry, and vectors.
- bearings, compass directions, grid references
- find areas of non-uniform shapes using knowledge of coordinates or maps.

This topic may contribute to the assessment of:

AS1.2 (91945) Explore mathematical problems that relate to life in Aotearoa New Zealand or the Pacific (Internal – 5 credits)

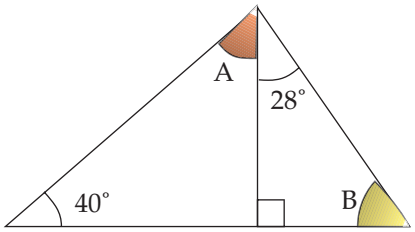
and build knowledge for

AS1.4 (91947) Demonstrate mathematical reasoning (External – 5 credits)

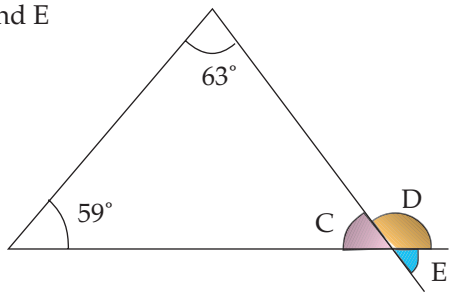
These exercises are from Page 30 of the Year 11 Mathematics Course Book and the answers are on Page 345.

From the Year 11 Mathematics Course Book, find the required angles along with the geometric justification (reason).

1. A and B.

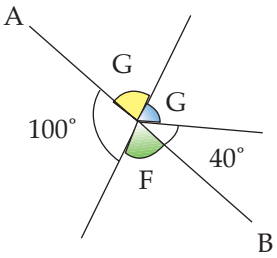


2. C, D and E

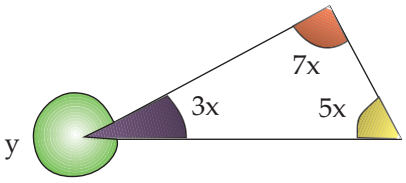


3. F and G.

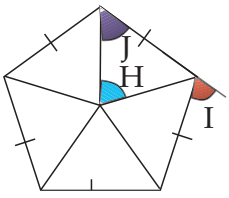
Note: AB is a straight line.



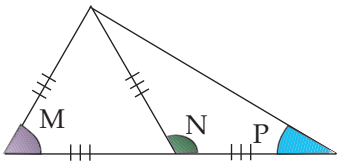
4. x and y.



5. H, I and J. The pentagon is regular.

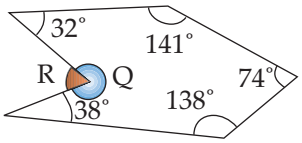


6. M, N and P.

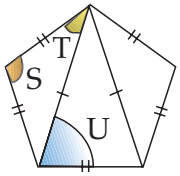


These exercises are from Page 30 of the Year 11 Mathematics Course Book and the answers are on Page 345.

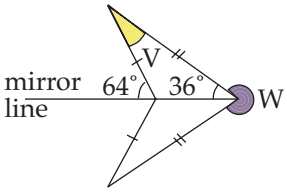
7. Q and R.



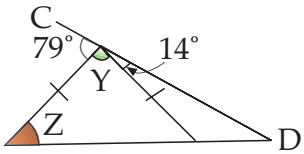
8. S, T and U.



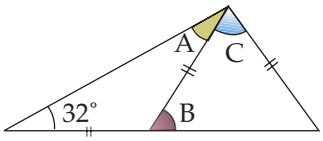
9. V and W.



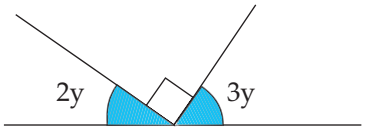
10. Y and Z.



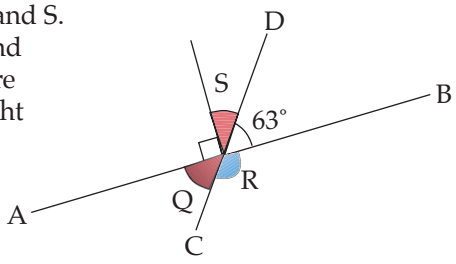
11. A, B and C.



12. y.



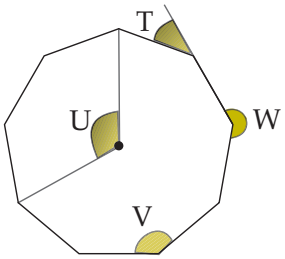
13. Q, R and S. AB and CD are straight lines.



These exercises are from Page 30 of the Year 11 Mathematics Course Book and the answers are on Page 345.

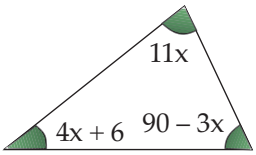
14. T, U, V and W.

The polygon is regular.

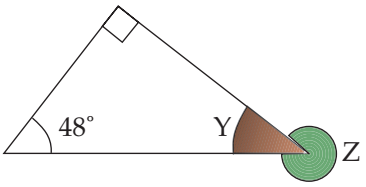


These exercises are from Page 31 of the Year 11 Mathematics Course Book and the answers are on Page 345.

15. Calculate x.

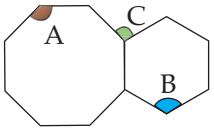


16. Y and Z.

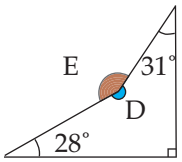


17. A, B and C.

These polygons are regular.



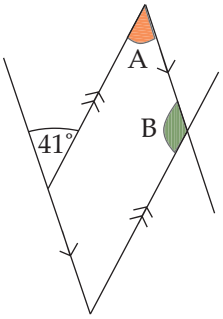
18. D and E.



These exercises are from Page 32 of the Year 11 Mathematics Course Book and the answers are on Page 345.

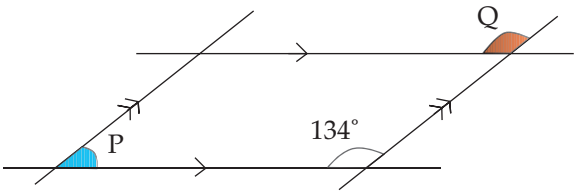
From the Year 11 Mathematics Course Book, find the required angles along with the geometric justification (reason).

19. A and B.

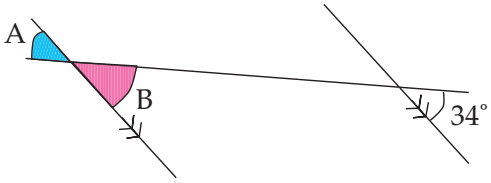


These exercises are from Page 32 of the Year 11 Mathematics Course Book and the answers are on Page 345.

20. P and Q.

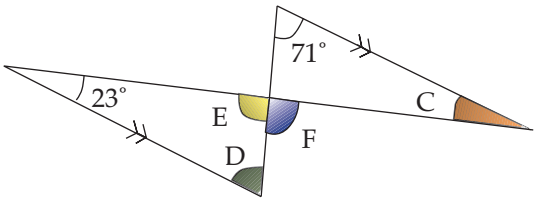


21. A and B.

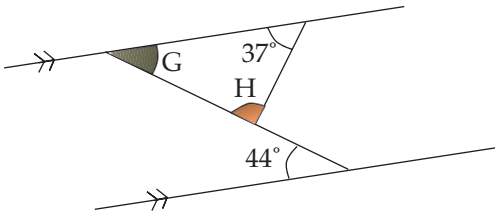


These exercises are from Page 33 of the Year 11 Mathematics Course Book and the answers are on Page 345.

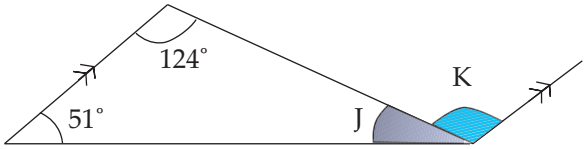
22. C, D, E and F.



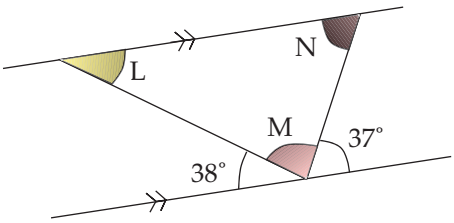
23. G and H.



24. J and K.

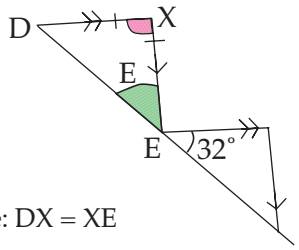


25. L, M and N.



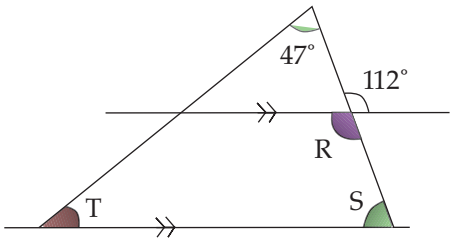
These exercises are from Page 33 of the Year 11 Mathematics Course Book and the answers are on Page 346.

26. E and X.

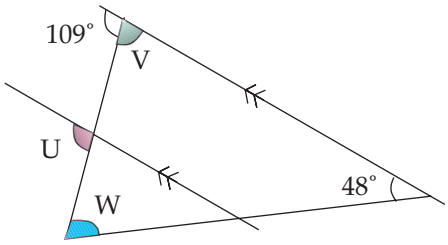


Note: DX = XE

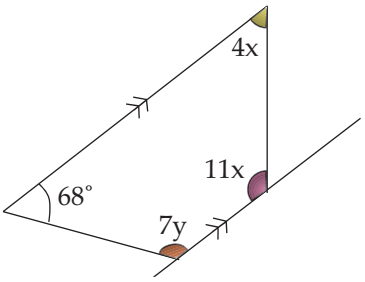
27. R, S and T.



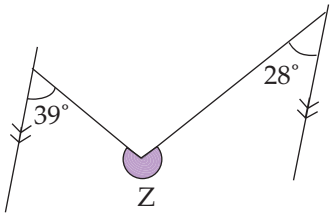
28. U, V and W.



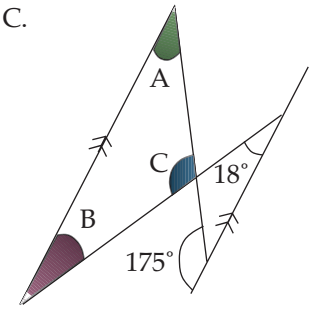
29. x and y.



30. Z.

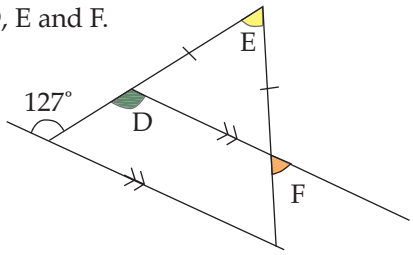


31. A, B and C.



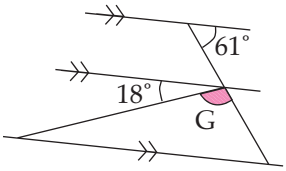
These exercises are from Page 33 of the Year 11 Mathematics Course Book and the answers are on Page 346.

32. D, E and F.

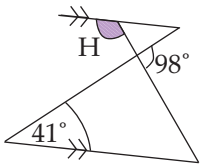


These exercises are from Page 34 of the Year 11 Mathematics Course Book and the answers are on Page 346.

33. G.



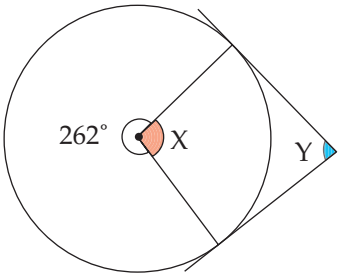
34. H.



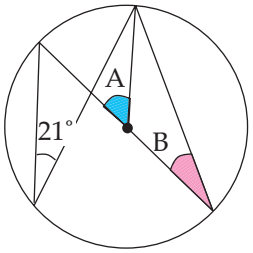
These exercises are from Page 36 of the Year 11 Mathematics Course Book and the answers are on Page 346.

From the Year 11 Mathematics Course Book, calculate, with reasons, in alphabetical order the unknown angles.

35. X and Y. Both lines are tangential to the circle.

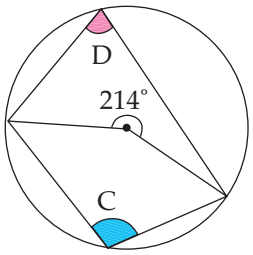


36. A and B.

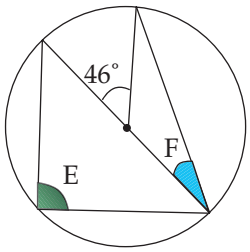


These exercises are from Page 37 of the Year 11 Mathematics Course Book and the answers are on Page 346.

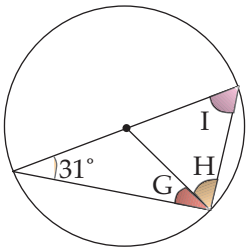
37. C and D.



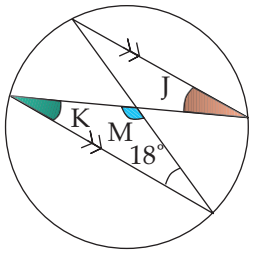
38. E and F.



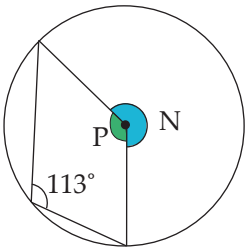
39. G, H and I.



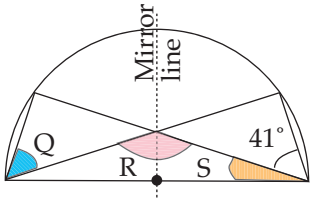
40. J, K and M.



41. N and P.

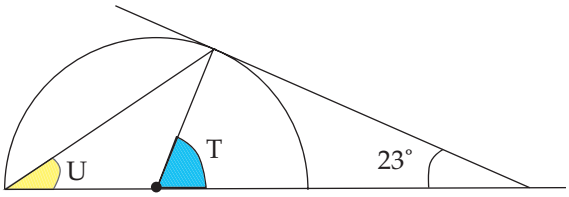


42. Q, R and S. The shape is a semi-circle.

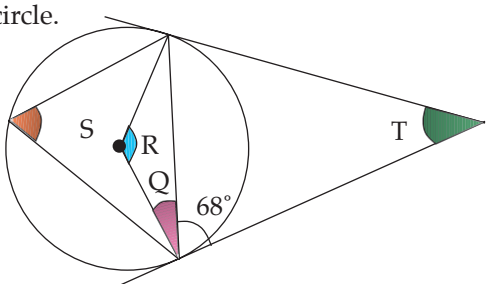


These exercises are from Page 37 of the Year 11 Mathematics Course Book and the answers are on Page 346.

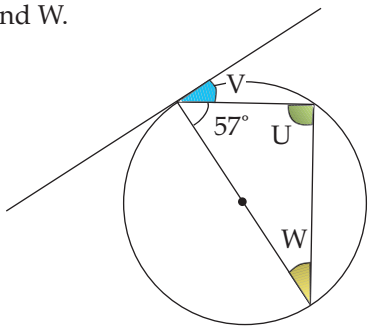
43. T and U. The shape is a semi-circle and the line is a tangent to the semi-circle.



44. Q, R, S and T. Both lines are tangential to the circle.

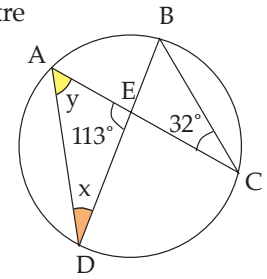


45. U, V and W.

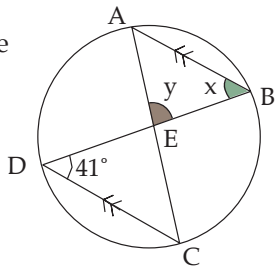


From the Year 11 Mathematics Course Book, find the angles x and y and give the geometric justification(s) (reason).

46. E is not the centre of the circle.

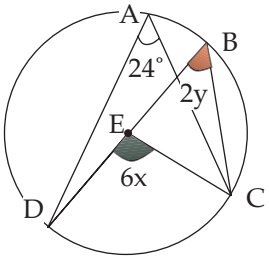


47. AB is // to CD. E is not the centre of the circle.

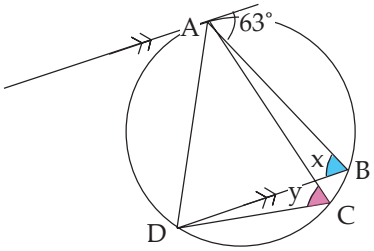


These exercises are from Page 38 of the Year 11 Mathematics Course Book and the answers are on Page 346.

48.



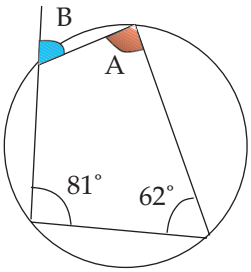
49.



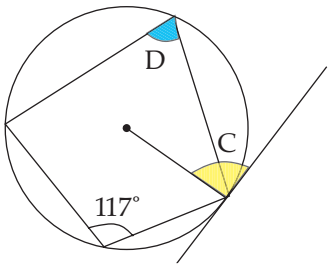
These exercises are from Page 39 of the Year 11 Mathematics Course Book and the answers are on Page 347.

From the Year 11 Mathematics Course Book, calculate, with reasons, the unknown angles in alphabetical order.

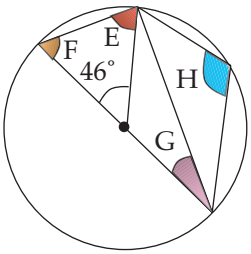
50. A and B.



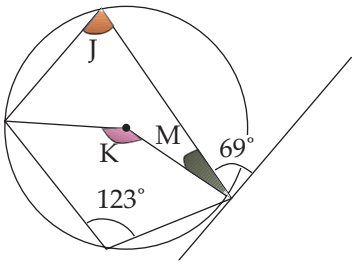
51. C and D.



52. E, F, G and H.

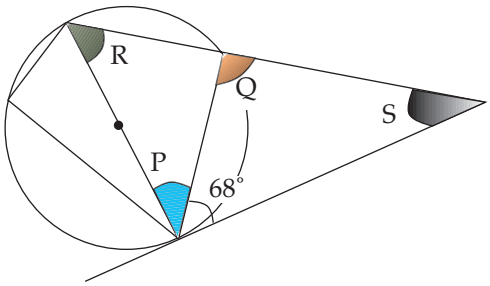


53. J, K and M.

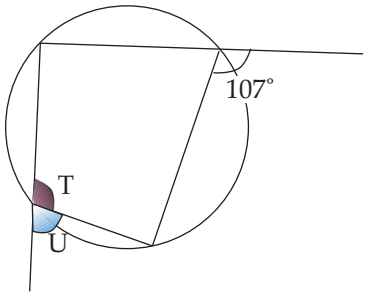


These exercises are from Page 39 of the Year 11 Mathematics Course Book and the answers are on Page 347.

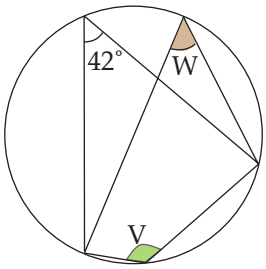
54. P, Q, R and S.



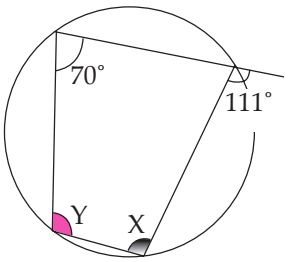
55. T and U.



56. V and W.

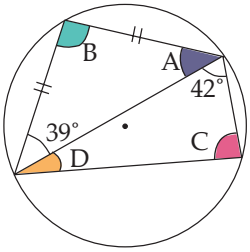


57. X and Y.

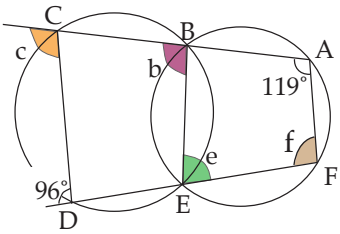


These exercises are from Page 40 of the Year 11 Mathematics Course Book and the answers are on Page 347.

58. A, B, C and D.

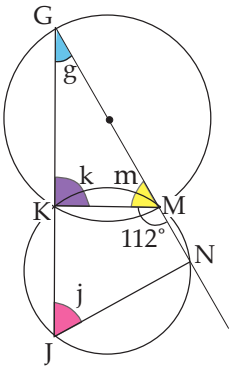


59. b, c, e and f.

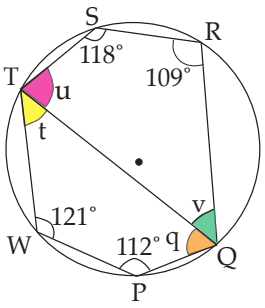


These exercises are from Page 40 of the Year 11 Mathematics Course Book and the answers are on Page 347.

60. m, g, k and j.



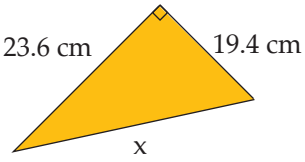
61. q, v, u and t.



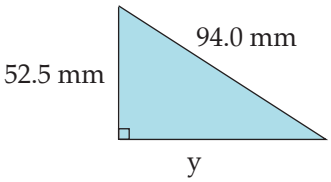
These exercises are from Page 41 of the Year 11 Mathematics Course Book and the answers are on Page 347.

From the Year 11 Mathematics Course Book, use the Theorem of Pythagoras to find the required lengths in the right-angled triangles. State units and round to the least number of decimal places.

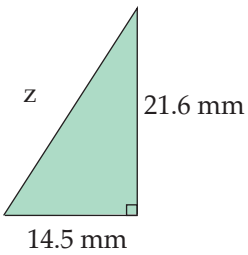
62. Calculate the length x.



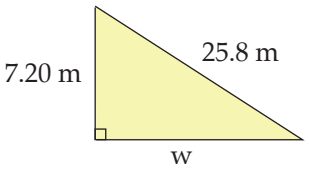
63. Calculate the length y.



64. Calculate the length z.

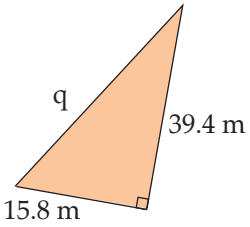


65. Calculate the length w.

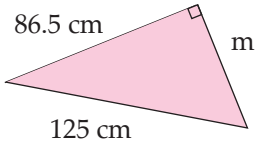


These exercises are from Page 41 of the Year 11 Mathematics Course Book and the answers are on Page 347.

66. Calculate the length q.

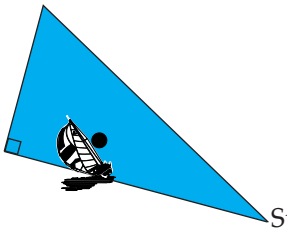


67. Calculate the length m.



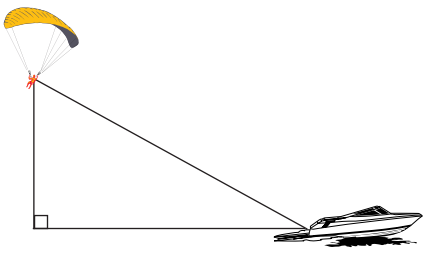
From the Year 11 Mathematics Course Book, use the Theorem of Pythagoras to find the required lengths in the given situations. Add known measurements to the diagram.

68.

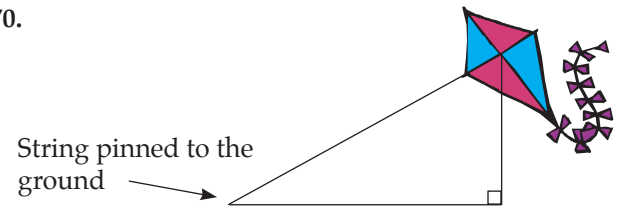


These exercises are from Page 42 of the Year 11 Mathematics Course Book and the answers are on Page 347.

69.

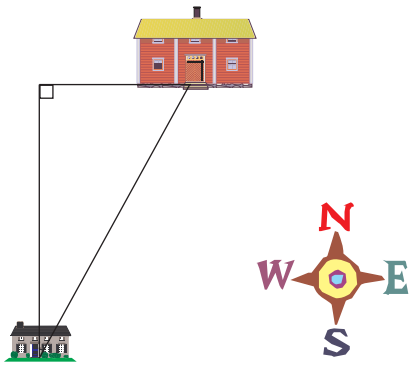


70.

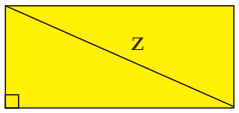


These exercises are from Page 42 of the Year 11 Mathematics Course Book and the answers are on Page 347.

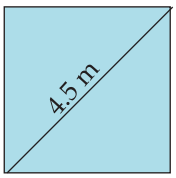
71.



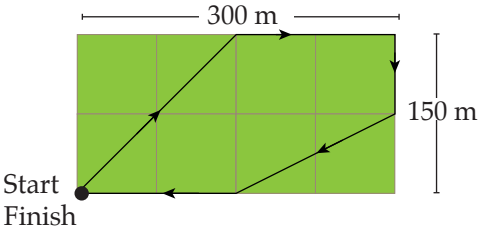
72.



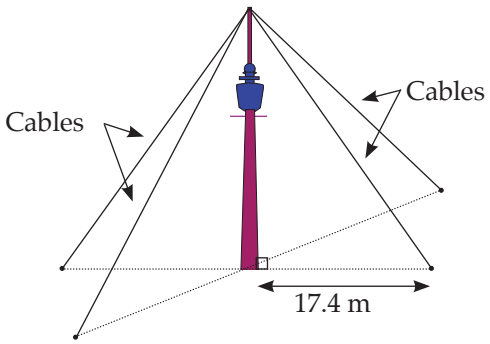
73.



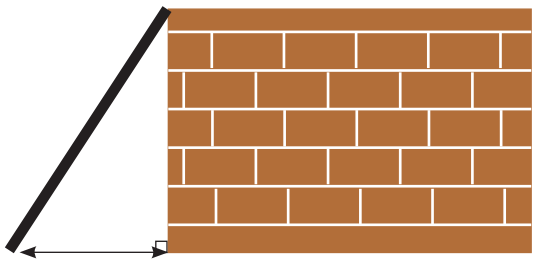
74.



75.

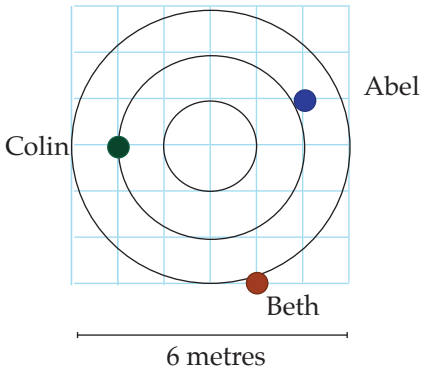


76.

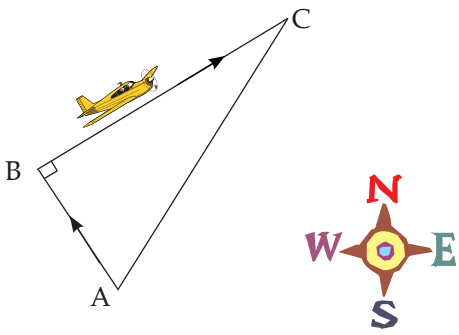


These exercises are from Page 43 of the Year 11 Mathematics Course Book and the answers are on Page 347.

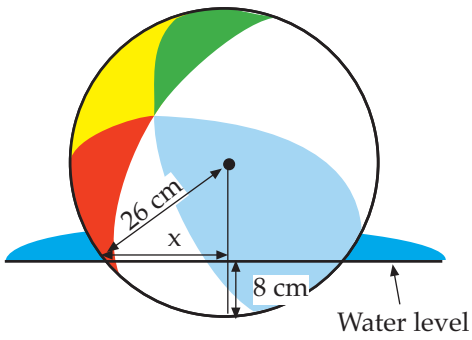
77. a), b) and c)



78.



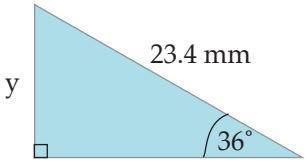
79.



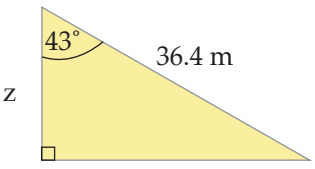
These exercises are from Page 45 of the Year 11 Mathematics Course Book and the answers are on Page 347.

From the Year 11 Mathematics Course Book, find the lengths of the unknown sides in the right-angled triangles below.

80.

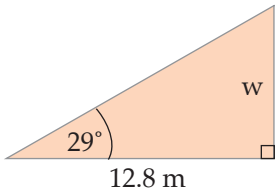


81.

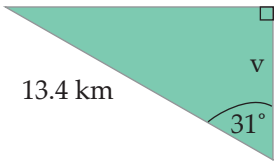


These exercises are from Page 45 of the Year 11 Mathematics Course Book and the answers are on Page 347.

82.



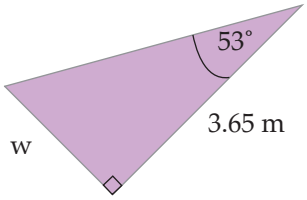
83.



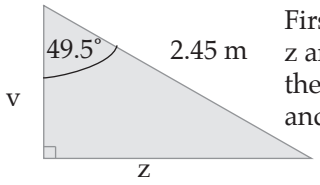
These exercises are from Page 46 of the Year 11 Mathematics Course Book and the answers are on Page 348.

From the Year 11 Mathematics Course Book, find the required lengths in the right-angled triangles. Where required, add the information to the diagram.

84.

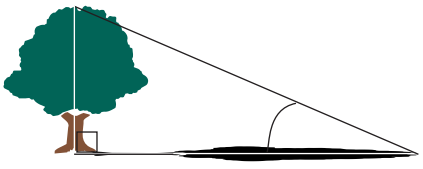


85.

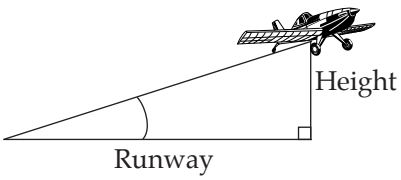


First ignore z and find v, then ignore v and find z.

86.

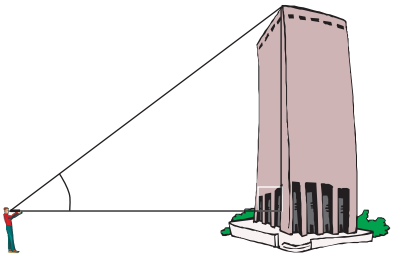


87.



These exercises are from Page 46 of the Year 11 Mathematics Course Book and the answers are on Page 348.

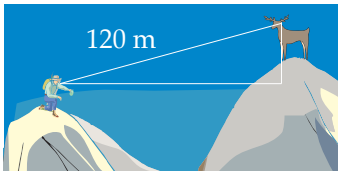
88.



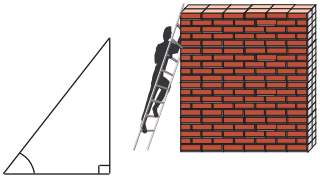
89.

90.

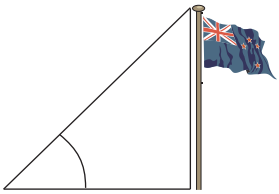
91.



92.

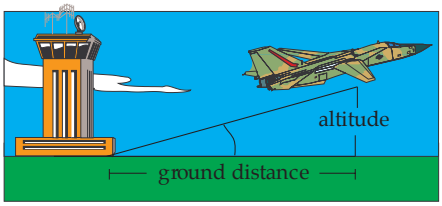


93.

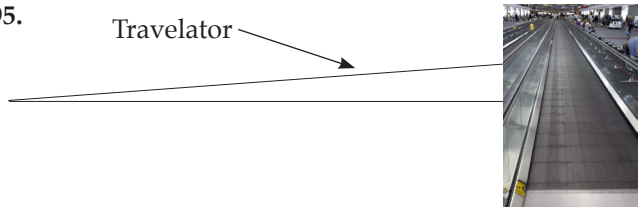


These exercises are from Page 47 of the Year 11 Mathematics Course Book and the answers are on Page 348.

94. a), b), c) and d)



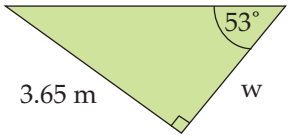
95.



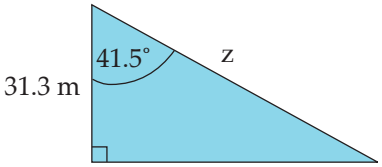
These exercises are from Page 48 of the Year 11 Mathematics Course Book and the answers are on Page 348.

From the Year 11 Mathematics Course Book, find the required lengths in the right-angled triangles.

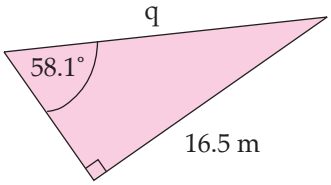
96.



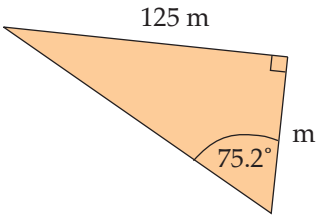
97.



98.

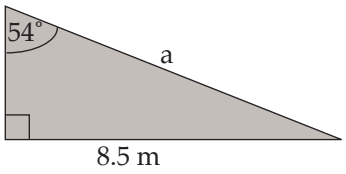


99.

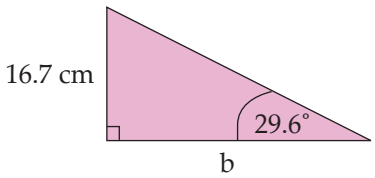


These exercises are from Page 48 of the Year 11 Mathematics Course Book and the answers are on Page 348.

100.

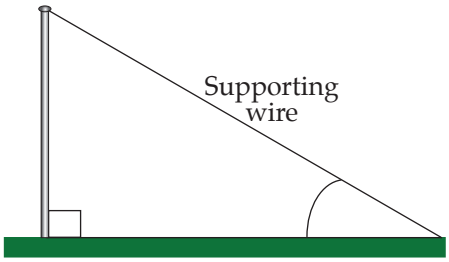


101.

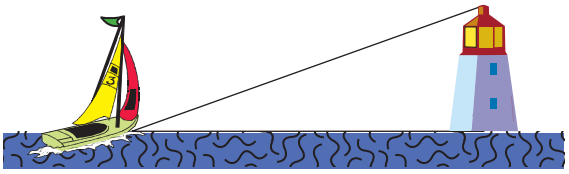


From the Year 11 Mathematics Course Book, find the required lengths in the right-angled triangles by first adding the measurement information to the diagram.

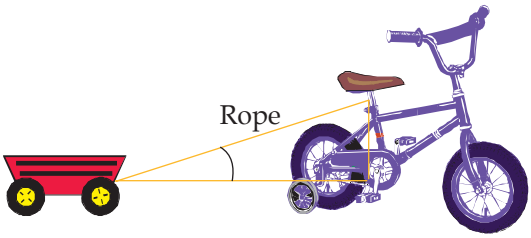
102.



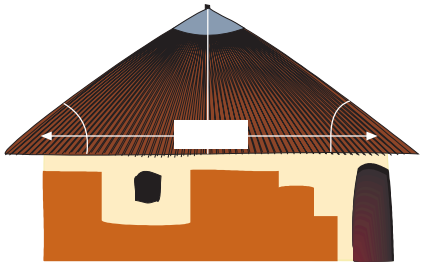
103.



104.



105.



These exercises are from Page 48 of the Year 11 Mathematics Course Book and the answers are on Page 348.

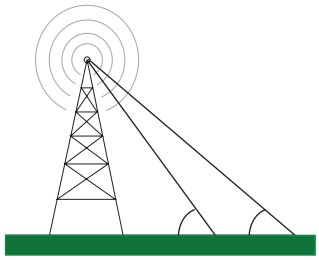
106.

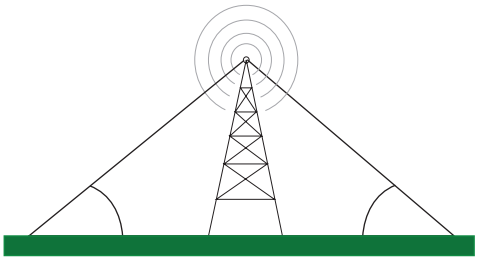
These exercises are from Page 49 of the Year 11 Mathematics Course Book and the answers are on Page 348.

107.

108.

109. a), b) and c)



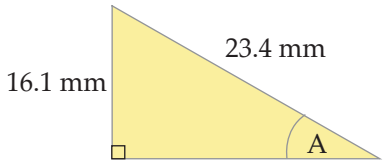


110.

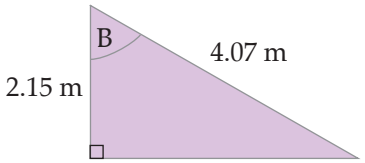
These exercises are from Page 50 of the Year 11 Mathematics Course Book and the answers are on Page 348.

From the Year 11 Mathematics Course Book, find the required angles in the triangles below, rounding your answers to one decimal place.

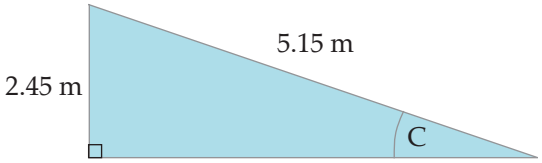
111.



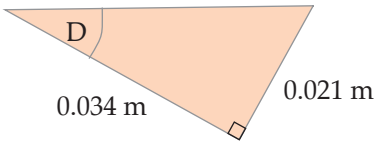
112.



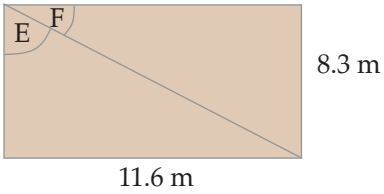
113.



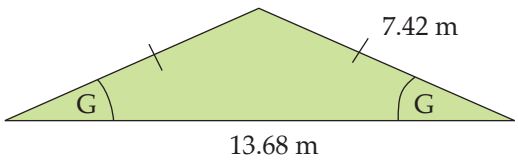
114.



115.

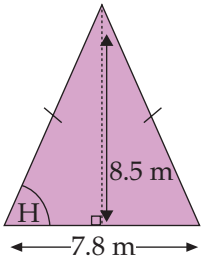


116.

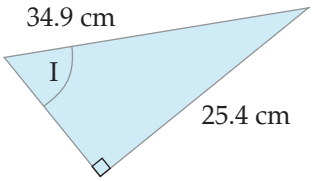


These exercises are from Page 50 of the Year 11 Mathematics Course Book and the answers are on Page 348.

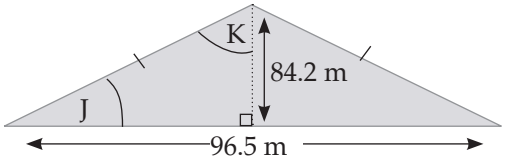
117.



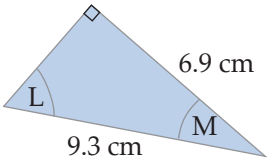
118.



119.

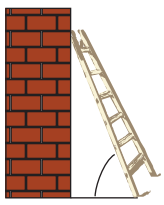


120.

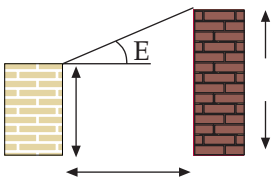


From the Year 11 Mathematics Course Book, find the required angle(s).

121.

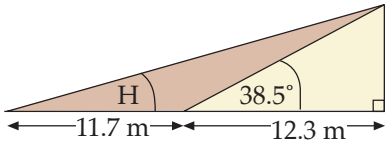


122.

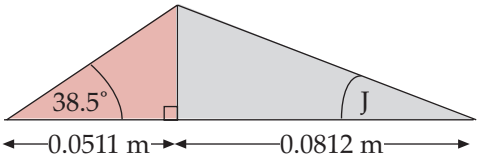


These exercises are from Page 51 of the Year 11 Mathematics Course Book and the answers are on Page 348.

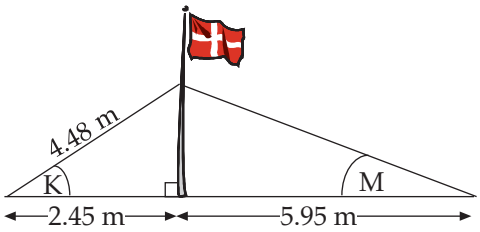
123.



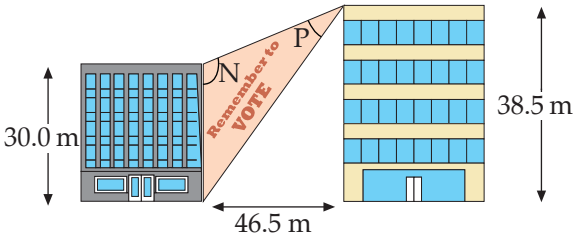
124.



125.



126.



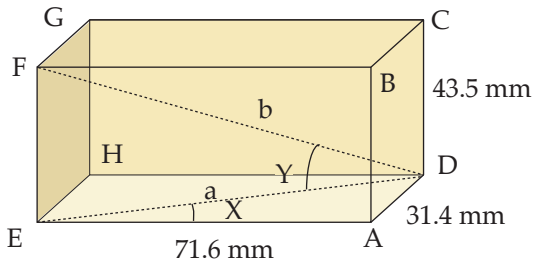
127.

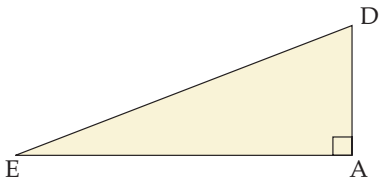
128.

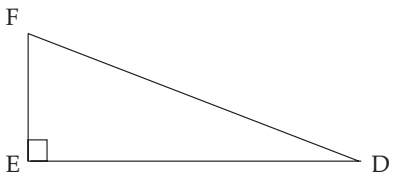
These exercises are from Page 53 of the Year 11 Mathematics Course Book and the answers are on Page 348.

From the Year 11 Mathematics Course Book, identify the right-angled triangles needed to answer the questions and then copy the measurements onto the blank triangles, to find the value of the unknown side or angle.

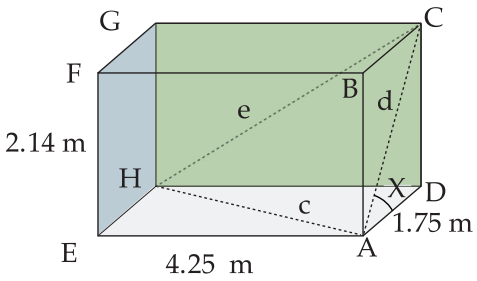
129. a), b), c) and d)

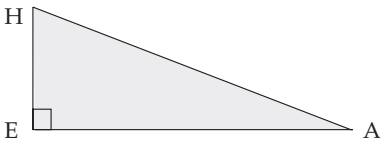


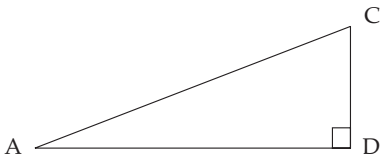




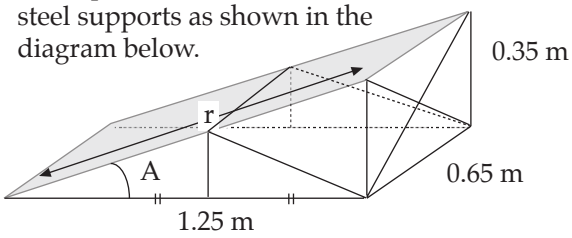
130. a), b), c) and d)

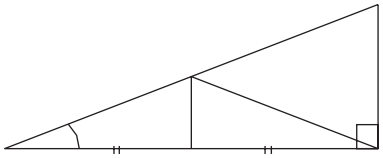


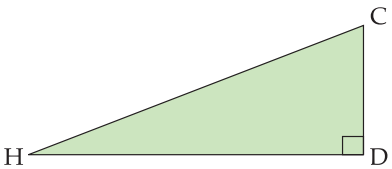




131. A ramp is to be constructed on the steel supports as shown in the diagram below.

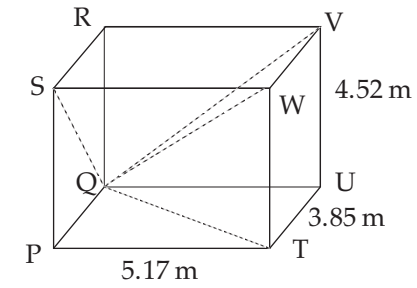


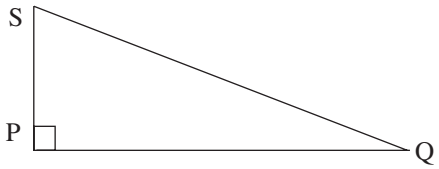


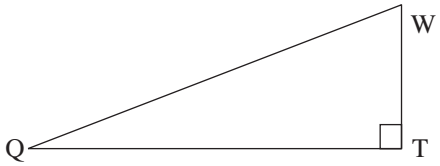


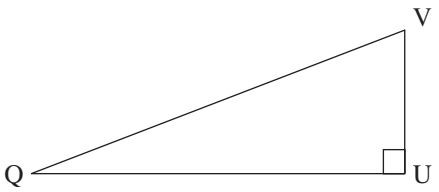
These exercises are from Page 54 of the Year 11 Mathematics Course Book and the answers are on Page 348.

132.



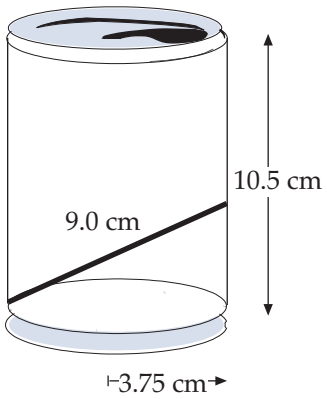




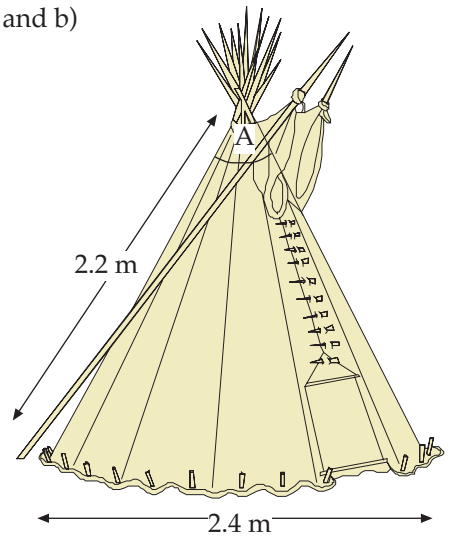


From the Year 11 Mathematics Course Book, devise a strategy to solve each problem. Explain your approach with the aid of a diagram.

133. a) and b)



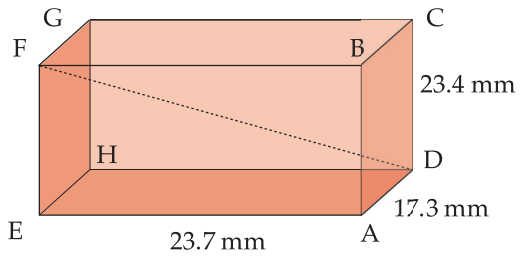
134. a) and b)



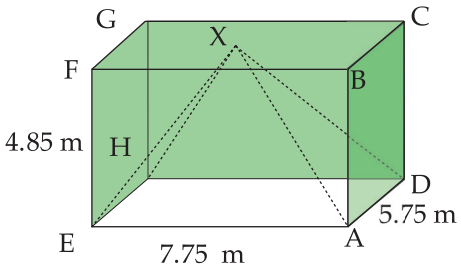
These exercises are from Page 57 of the Year 11 Mathematics Course Book and the answers are on Page 348 & 349.

From the Year 11 Mathematics Course Book, identify and draw the right-angled triangle needed to solve the problems and then find the value of the required angle. Communicate how you are solving the problem.

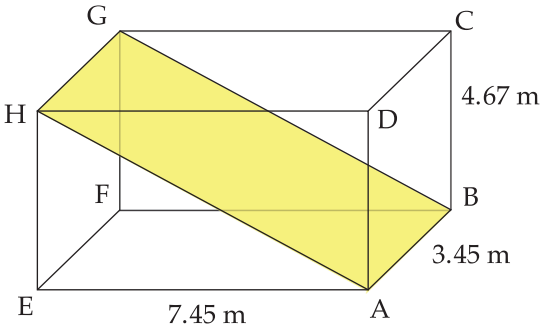
135. a) and b)



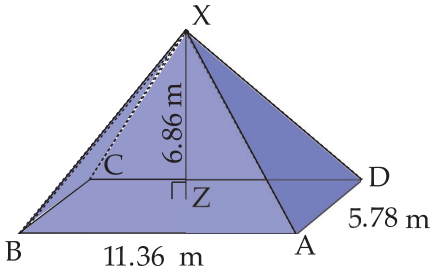
136. a) and b)



137. a) and b)

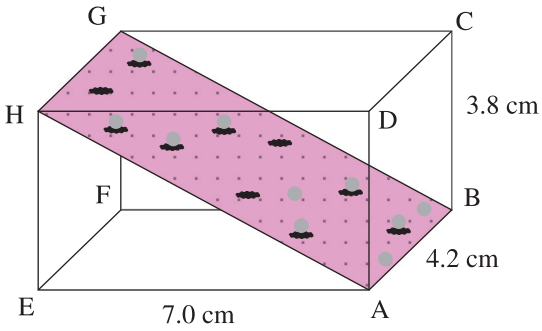


138. a) and b)

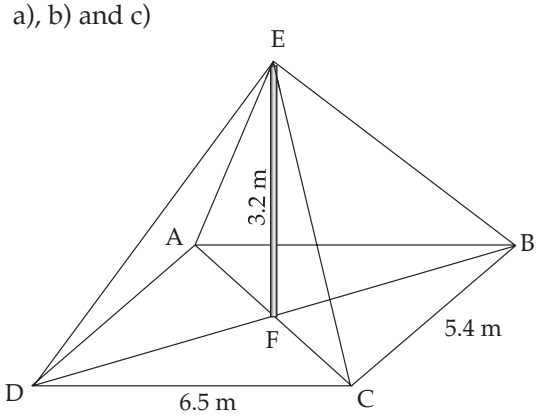


These exercises are from Page 57 of the Year 11 Mathematics Course Book and the answers are on Page 349.

139. a) and b)



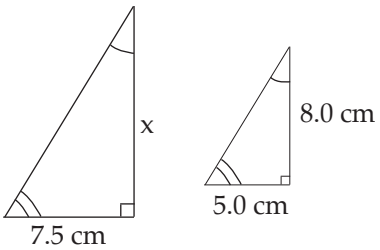
140. a), b) and c)



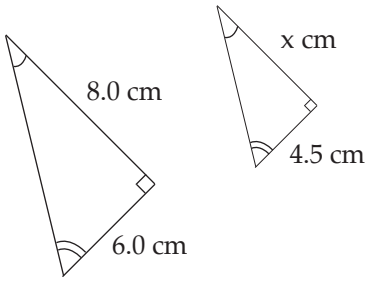
These exercises are from Page 59 of the Year 11 Mathematics Course Book and the answers are on Page 349.

From the Year 11 Mathematics Course Book, find the missing lengths of the pairs of similar triangles drawn below.

141.

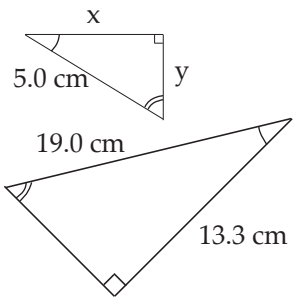


142.

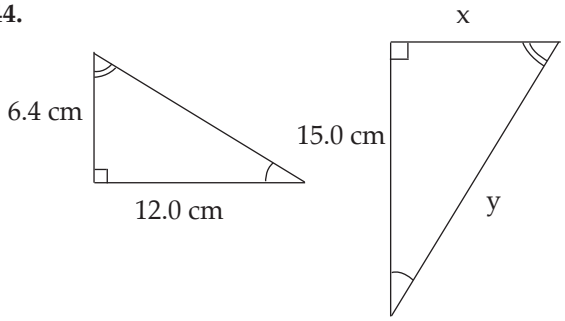


These exercises are from Page 59 of the Year 11 Mathematics Course Book and the answers are on Page 349.

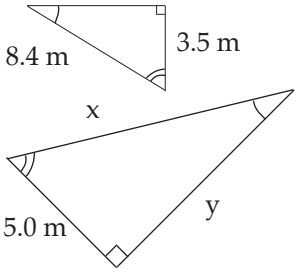
143.



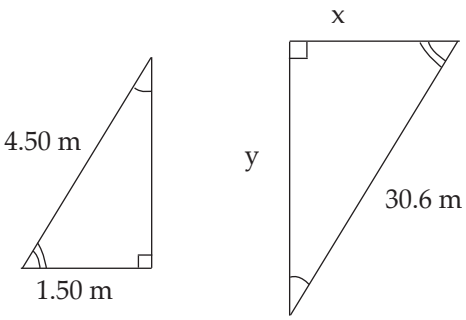
144.



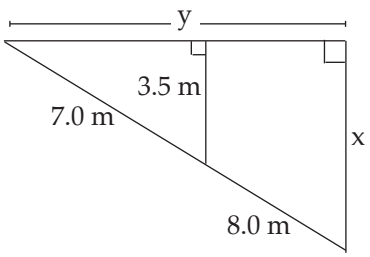
145.



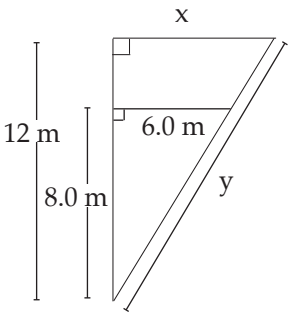
146.



147.

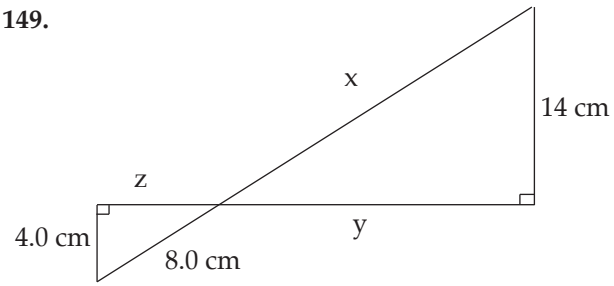


148.

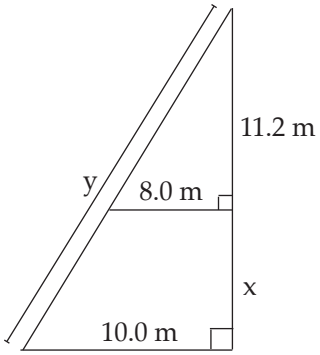


These exercises are from Page 59 of the Year 11 Mathematics Course Book and the answers are on Page 349.

149.

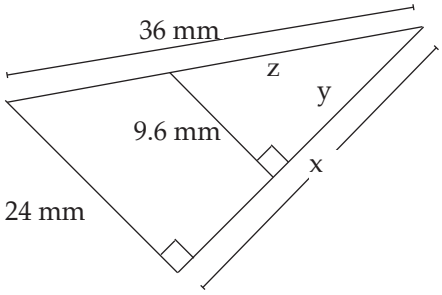


150.

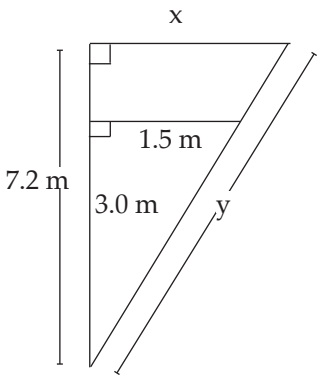


These exercises are from Page 60 of the Year 11 Mathematics Course Book and the answers are on Page 349.

151.

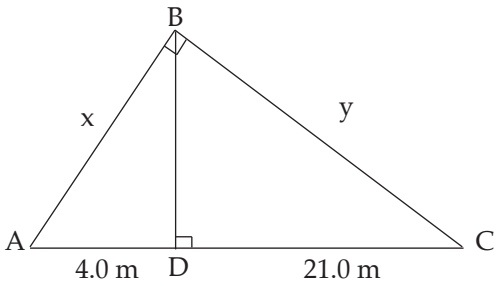


152.



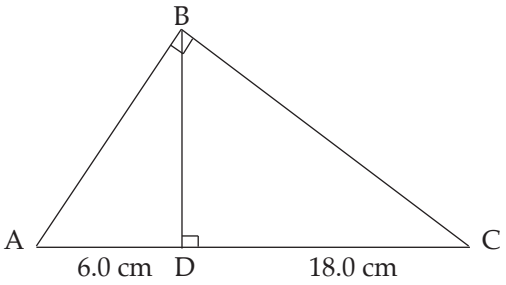
From the Year 11 Mathematics Course Book, find the required lengths.

153.

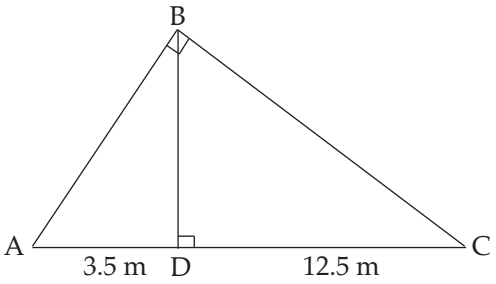


These exercises are from Page 60 of the Year 11 Mathematics Course Book and the answers are on Page 349.

154.



155.



From the Year 11 Mathematics Course Book, answer the questions.

156.

157.

158.

These exercises are from Page 60 of the Year 11 Mathematics Course Book and the answers are on Page 349.

159.

160.

161.

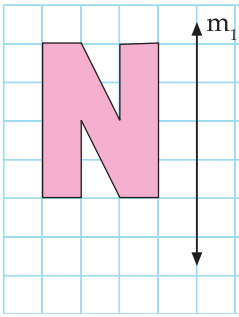
162.

163.

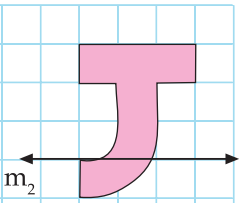
These exercises are from Page 62 of the Year 11 Mathematics Course Book and the answers are on Page 349 & 350.

From the Year 11 Mathematics Course Book, reflect each object in the specified mirror line.

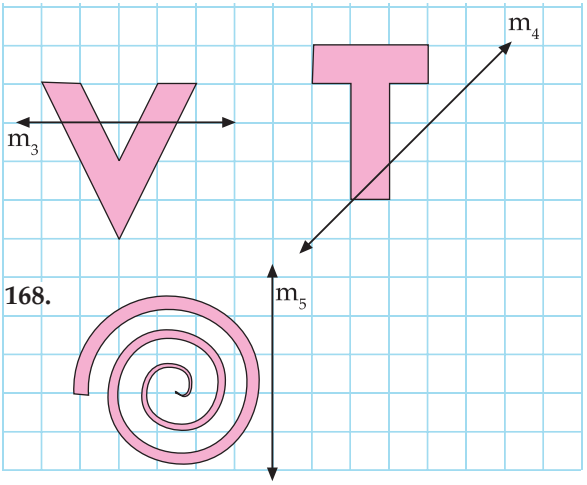
164.



165.



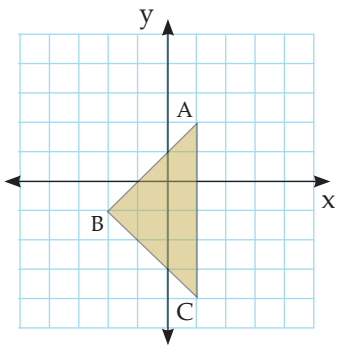
166.



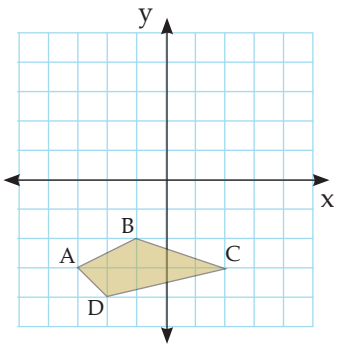
167.

168.

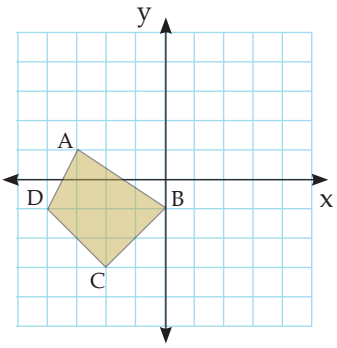
169.



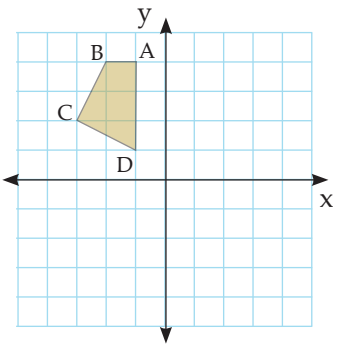
170.



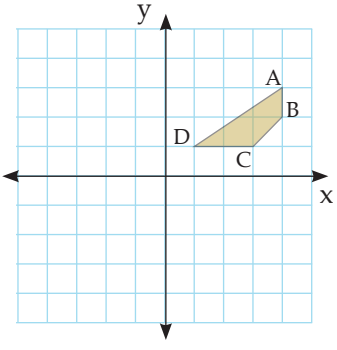
171.



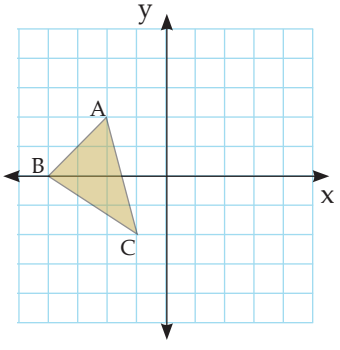
172.



173.



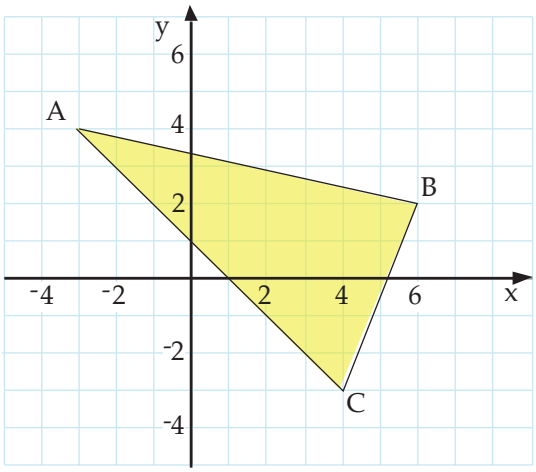
174.



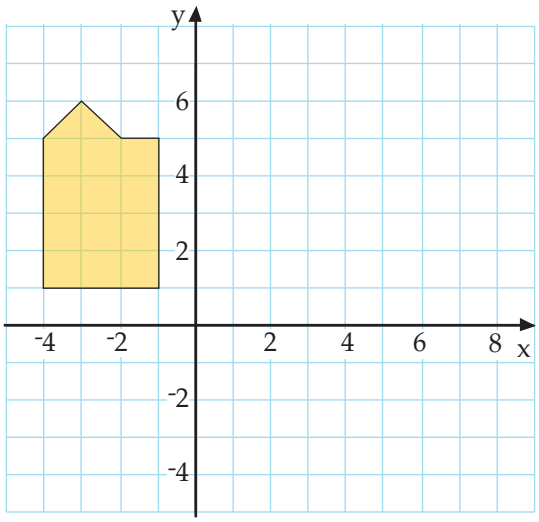
These exercises are from Page 63 of the Year 11 Mathematics Course Book and the answers are on Page 350.

From the Year 11 Mathematics Course Book, reflect the following objects in the mirror line indicated.

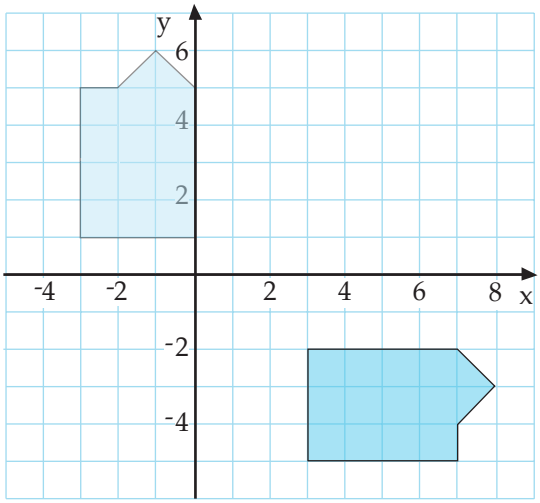
175.



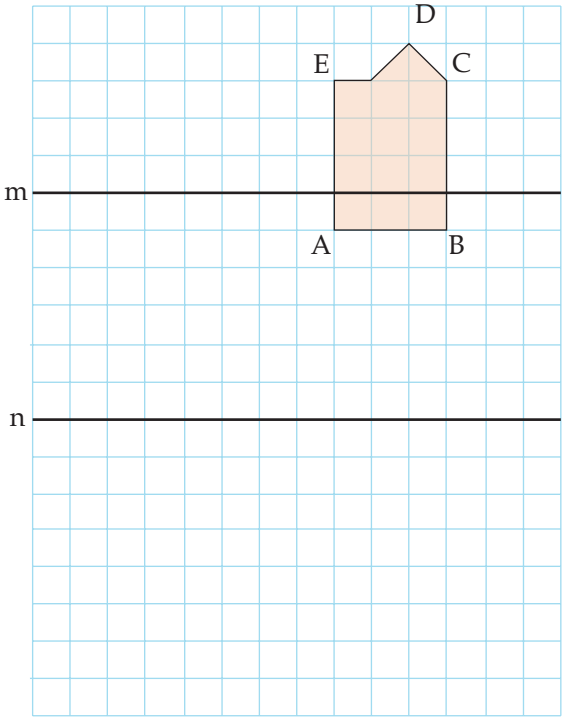
176.



177. a) and b)



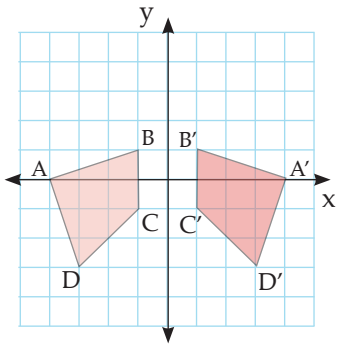
178. a), b) and c)



These exercises are from Page 64 of the Year 11 Mathematics Course Book and the answers are on Page 350.

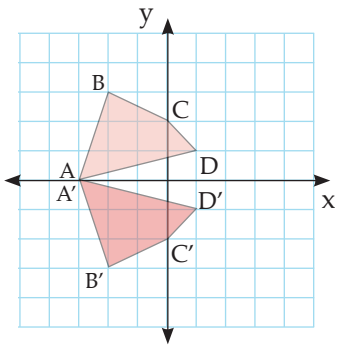
From the Year 11 Mathematics Course Book, describe the transformation that maps the object to its image.

179.

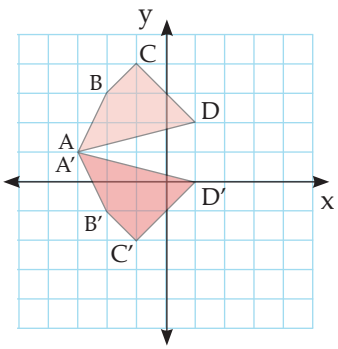


These exercises are from Page 64 of the Year 11 Mathematics Course Book and the answers are on Page 350.

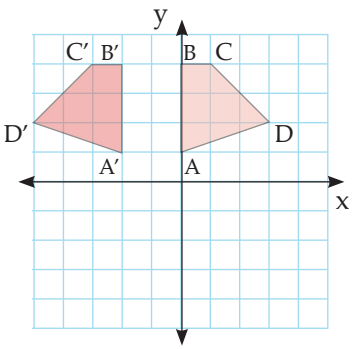
180.



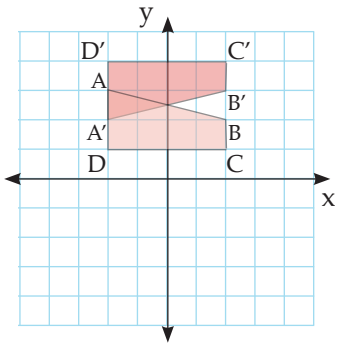
181.



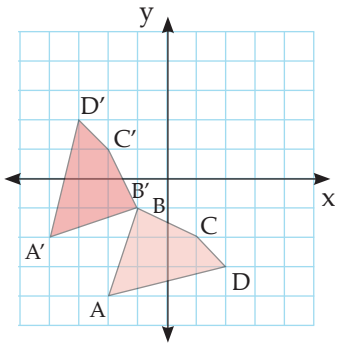
182.



183.



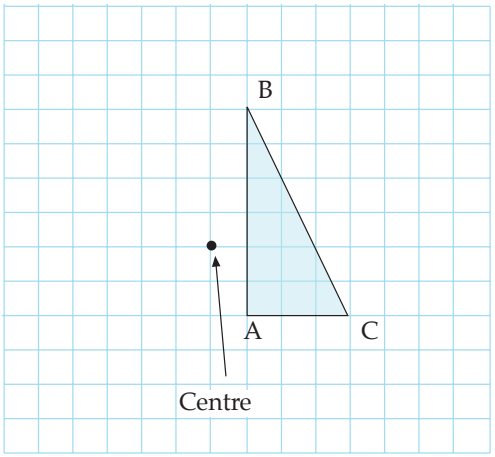
184.



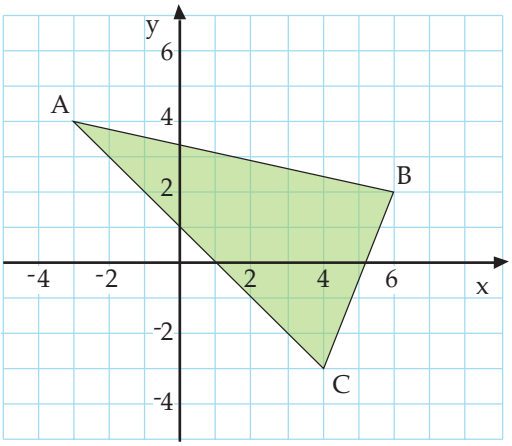
These exercises are from Page 66 of the Year 11 Mathematics Course Book and the answers are on Page 350.

From the Year 11 Mathematics Course Book, rotate each of the following objects, labelling your image.

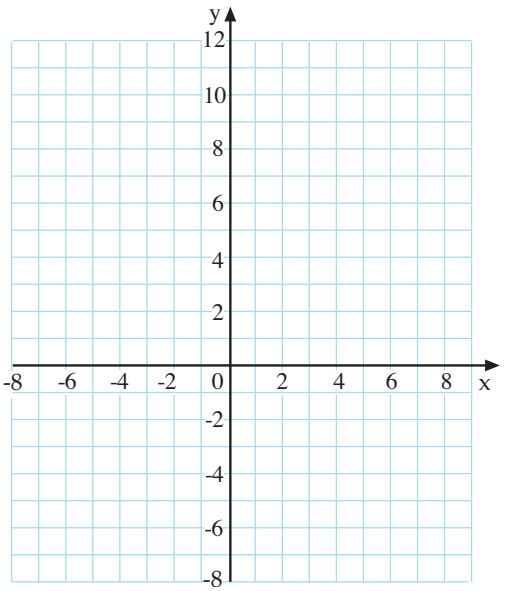
185.



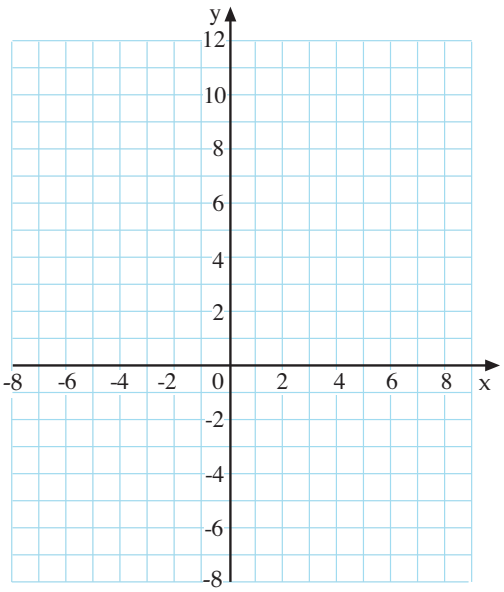
186.



187.

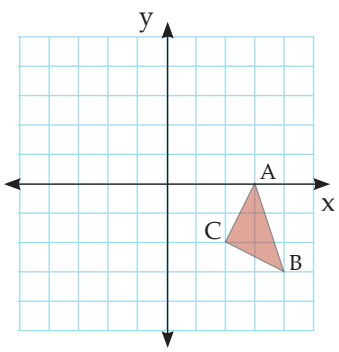


188.

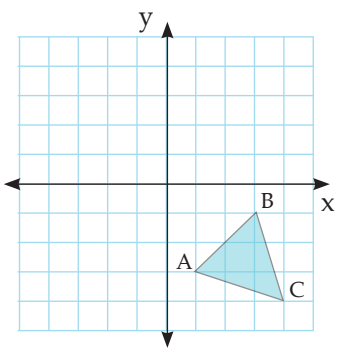


These exercises are from Page 67 of the Year 11 Mathematics Course Book and the answers are on Page 350.

189.

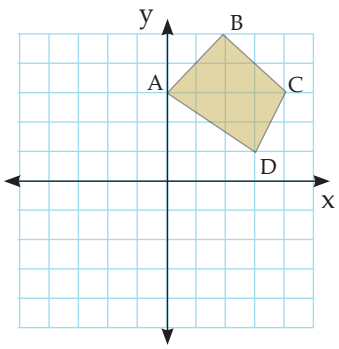


190.

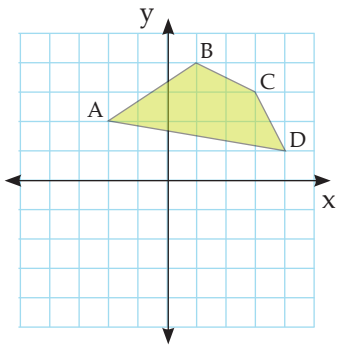


These exercises are from Page 67 of the Year 11 Mathematics Course Book and the answers are on Page 351.

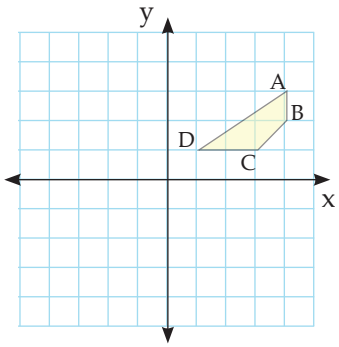
191.



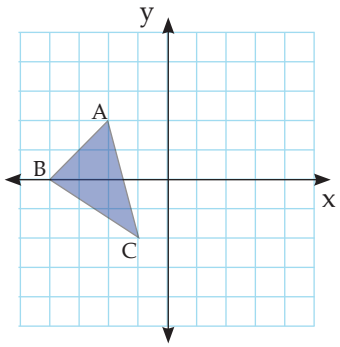
192.



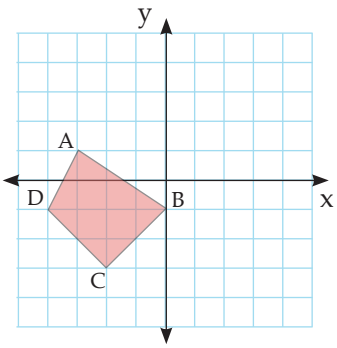
193.



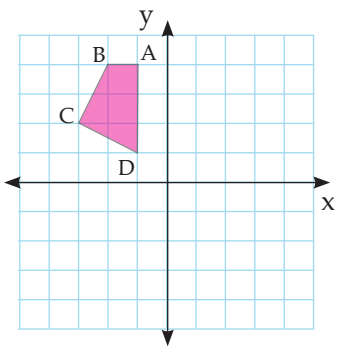
194.



195.

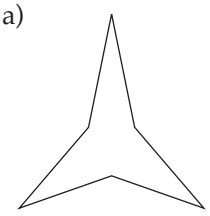


196.

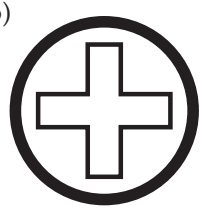


197. From the Year 11 Mathematics Course Book, give the order of rotational symmetry of the following shapes.

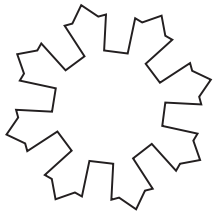
a)



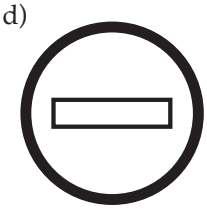
b)



c)

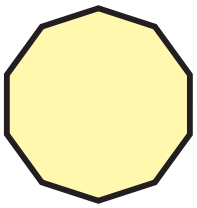


d)

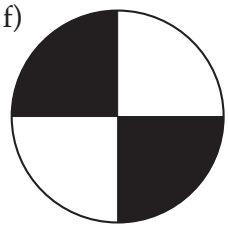


These exercises are from Page 68 of the Year 11 Mathematics Course Book and the answers are on Page 351.

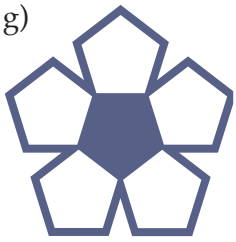
e)



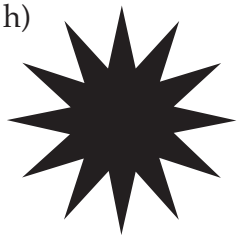
f)



g)



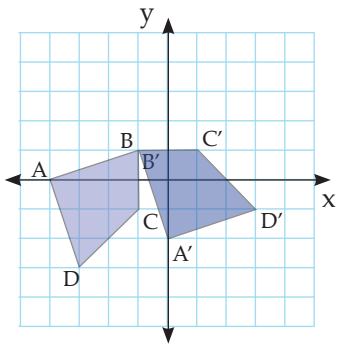
h)



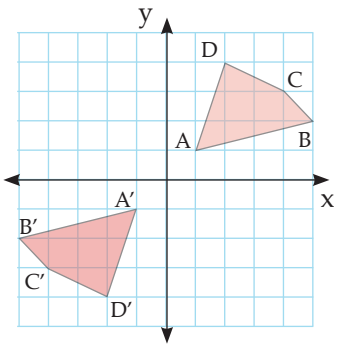
These exercises are from Page 68 of the Year 11 Mathematics Course Book and the answers are on Page 351.

From the Year 11 Mathematics Course Book, describe the transformation that maps the object to its image.

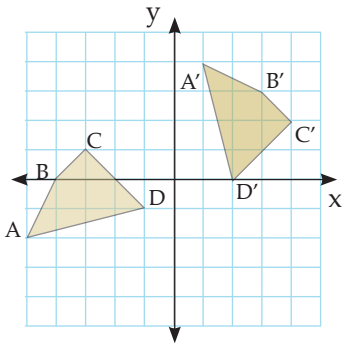
198.



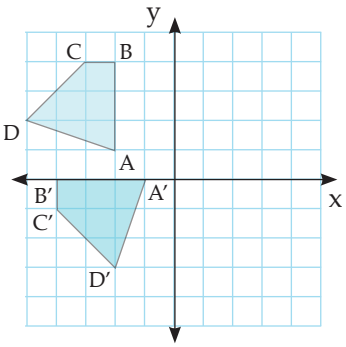
199.



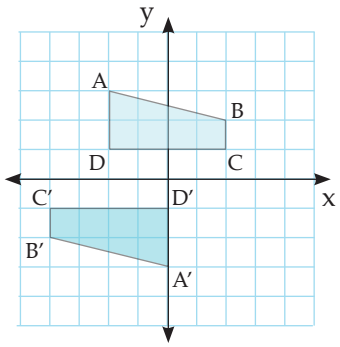
200.



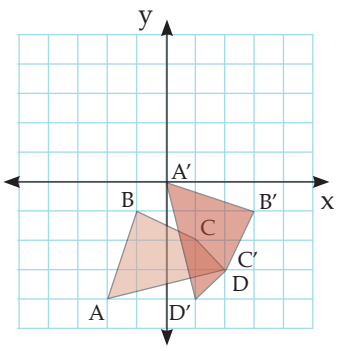
201.



202.



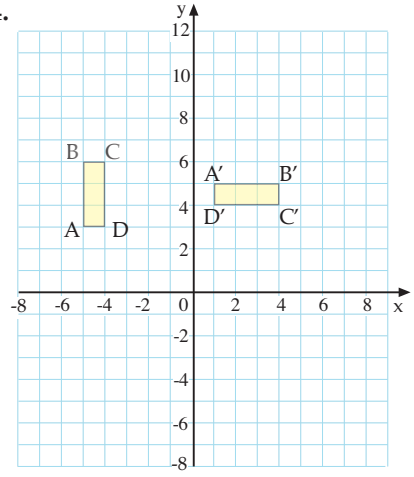
203.



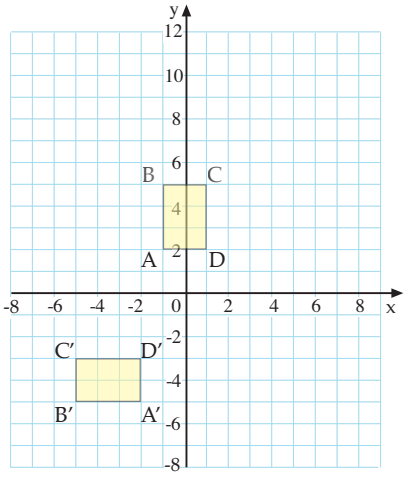
These exercises are from Page 70 of the Year 11 Mathematics Course Book and the answers are on Page 351.

From the Year 11 Mathematics Course Book, find the coordinates of the centre of rotation of the following and fully describe the transformation that maps figure ABCD onto figure A′B′C′D′.

204.

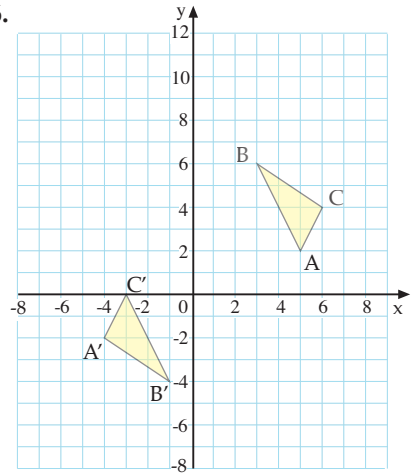


205.

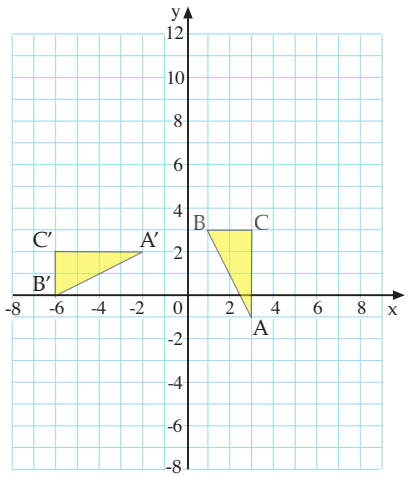


These exercises are from Page 70 of the Year 11 Mathematics Course Book and the answers are on Page 351.

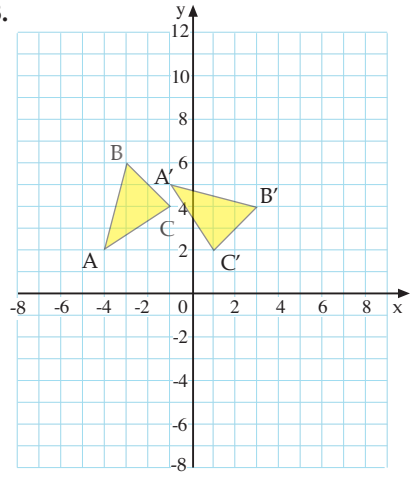
206.



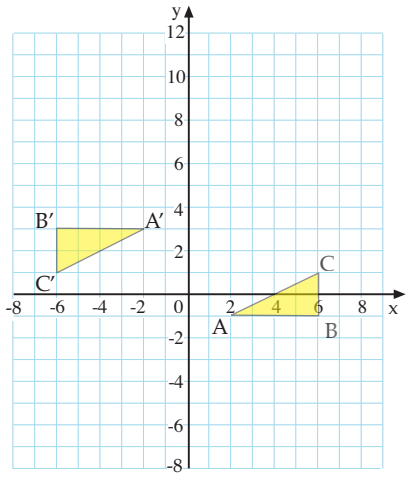
207.



208.



209.

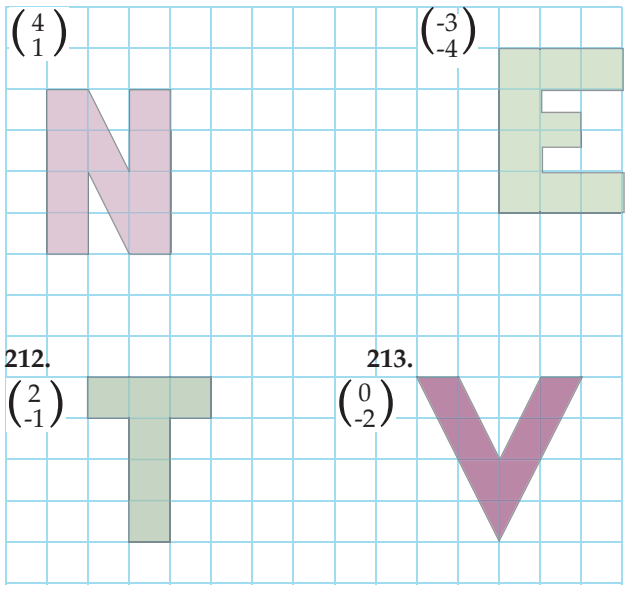


These exercises are from Page 72 of the Year 11 Mathematics Course Book and the answers are on Page 351.

From the Year 11 Mathematics Course Book, translate each object as described by the vector.

210. $\begin{pmatrix} 4 \\ 1 \end{pmatrix}$

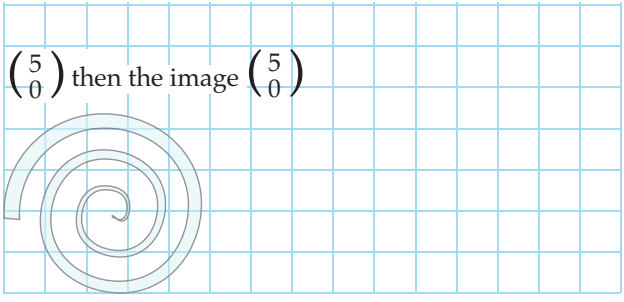
211. $\begin{pmatrix} -3 \\ -4 \end{pmatrix}$



212. $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$

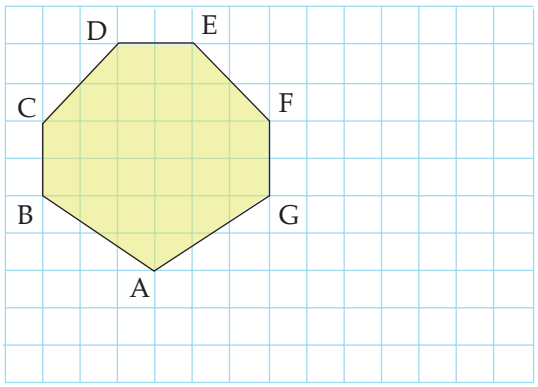
213. $\begin{pmatrix} 0 \\ -2 \end{pmatrix}$

214. $\begin{pmatrix} 5 \\ 0 \end{pmatrix}$ then the image $\begin{pmatrix} 5 \\ 0 \end{pmatrix}$

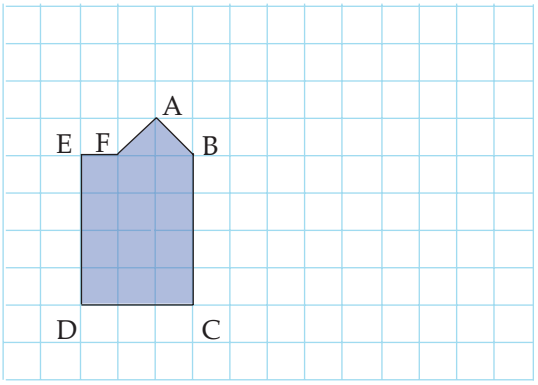


These exercises are from Page 72 of the Year 11 Mathematics Course Book and the answers are on Page 351.

215.

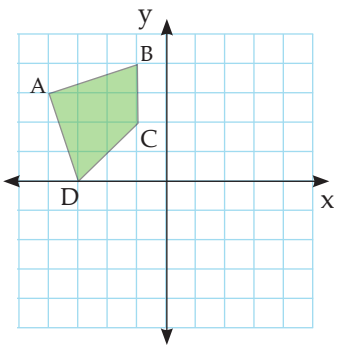


216.

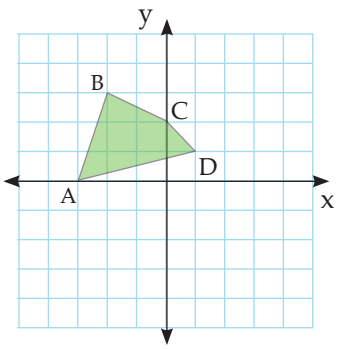


These exercises are from Page 73 of the Year 11 Mathematics Course Book and the answers are on Page 351 & 352.

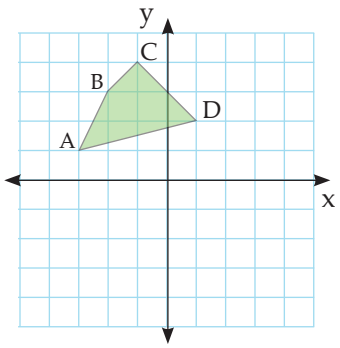
217.



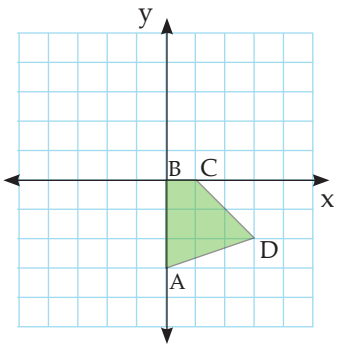
218.



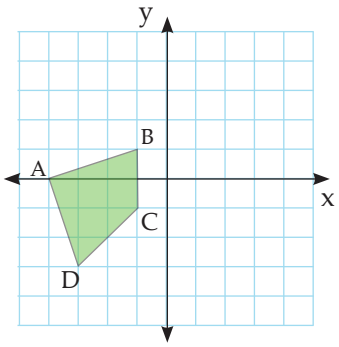
219.



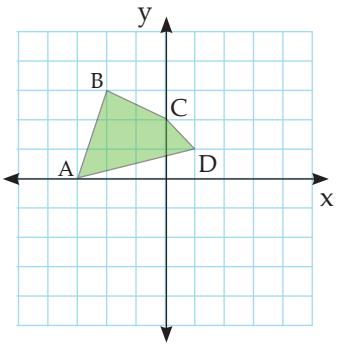
220.



221.

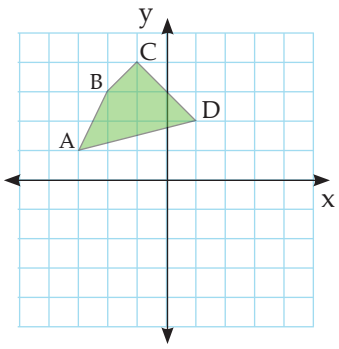


222.

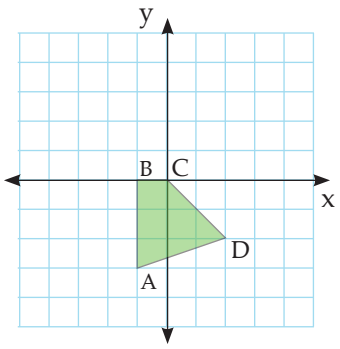


These exercises are from Page 73 of the Year 11 Mathematics Course Book and the answers are on Page 352.

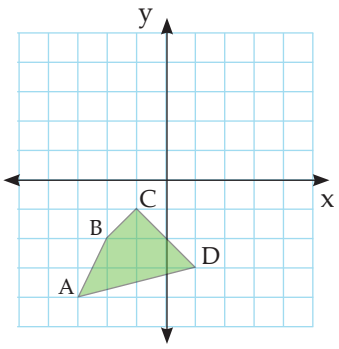
223.



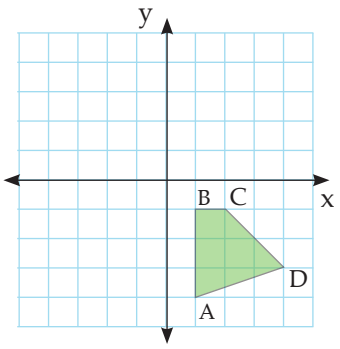
224.



225.



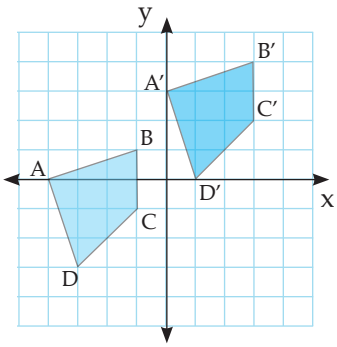
226.



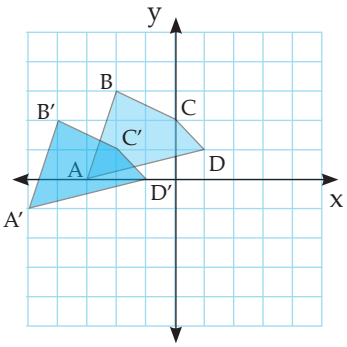
These exercises are from Page 74 of the Year 11 Mathematics Course Book and the answers are on Page 352.

From the Year 11 Mathematics Course Book, describe the transformation that maps the object to its image.

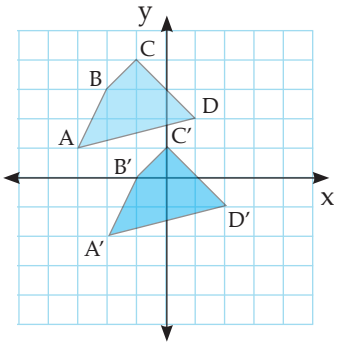
227.



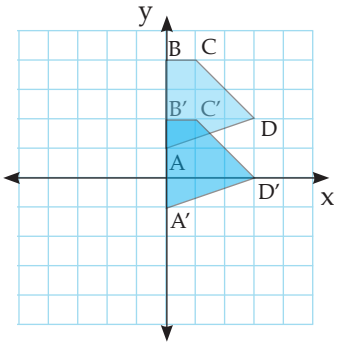
228.



229.

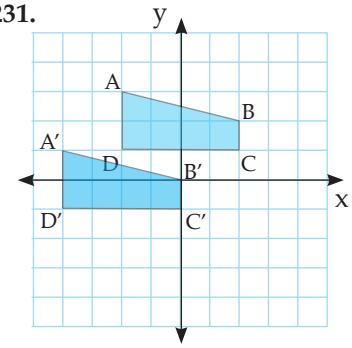


230.

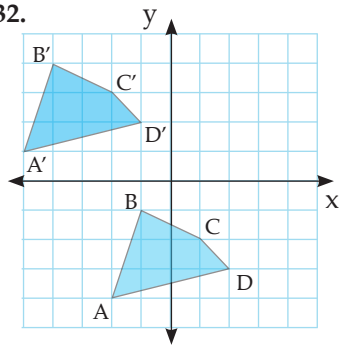


These exercises are from Page 74 of the Year 11 Mathematics Course Book and the answers are on Page 352.

231.



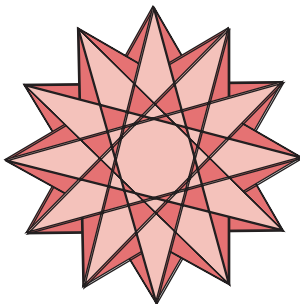
232.



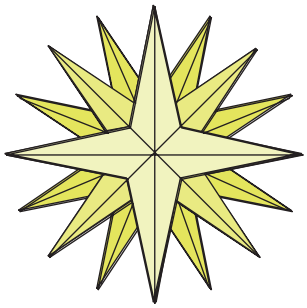
These exercises are from Page 76 of the Year 11 Mathematics Course Book and the answers are on Page 352.

From the Year 11 Mathematics Course Book, find the axes of symmetry, rotational symmetry and total order of symmetry for each figure.

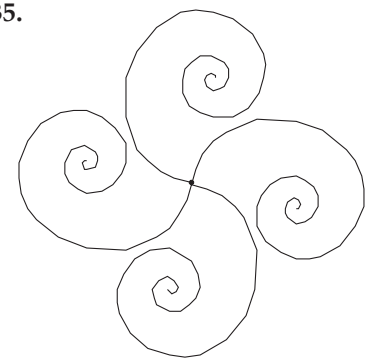
233.



234.

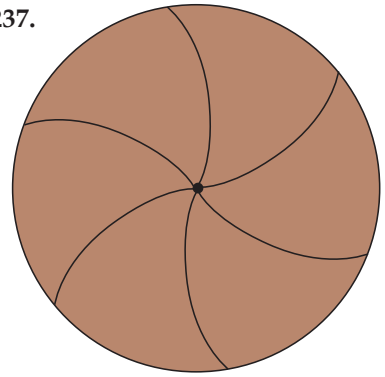


235.

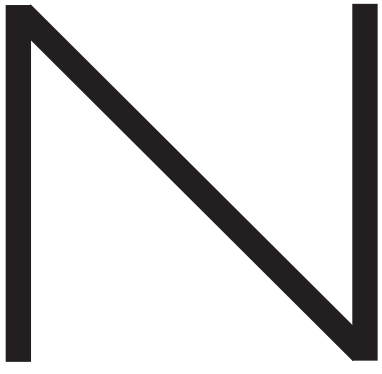


236.

237.

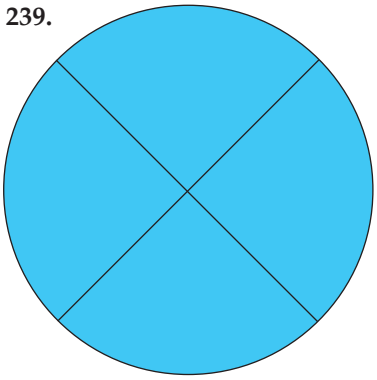


238.

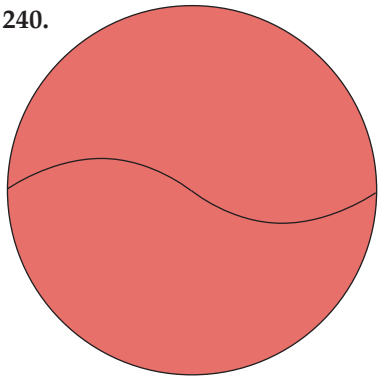


These exercises are from Page 76 of the Year 11 Mathematics Course Book and the answers are on Page 352.

239.



240.



These exercises are from Page 77 of the Year 11 Mathematics Course Book and the answers are on Page 352.

From the Year 11 Mathematics Course Book, find the axes of symmetry, rotational symmetry and total order of symmetry for each figure.

241.

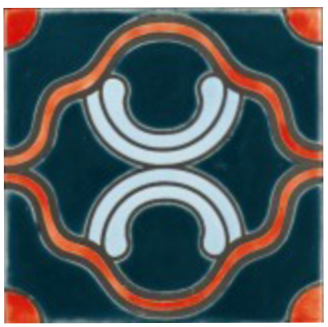
242.

243.

244.

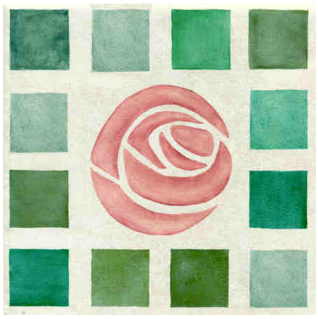
245.

246.



These exercises are from Page 77 of the Year 11 Mathematics Course Book and the answers are on Page 352.

247.



248.

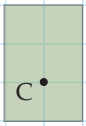
These exercises are from Page 80 of the Year 11 Mathematics Course Book and the answers are on Page 352.

From the Year 11 Mathematics Course Book, enlarge each object from the centre by the given scale factor. Label the image A′, B′ and C′ etc. when applicable.

249. SF = 2

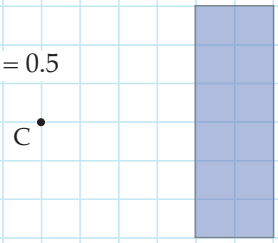
250. SF = 3

251. SF = 2

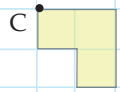


252. SF = 4

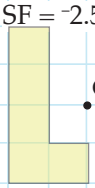
253. SF = 0.5



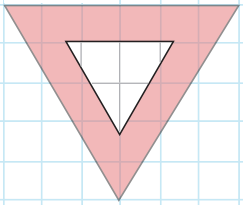
254. SF = 3



255. SF = $^{-}$2.5



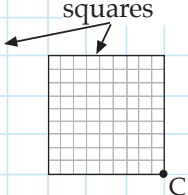
256. SF = $^{-}$1



257. SF = 3

In the square draw the first letter of your surname and then enlarge it.

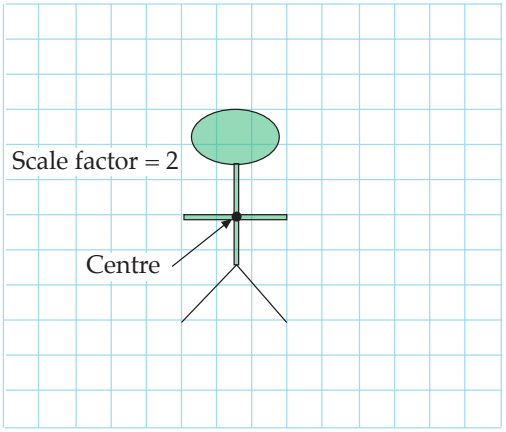
The small squares should correspond to the large squares



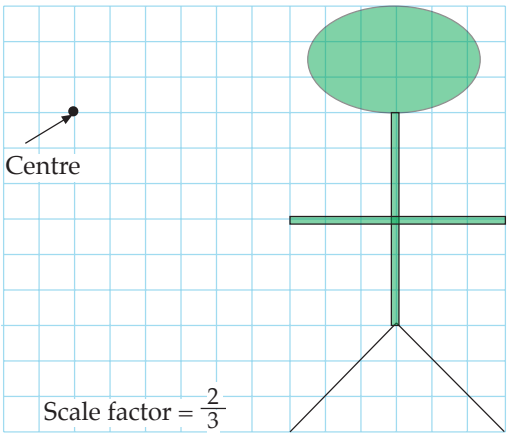
These exercises are from Page 80 of the Year 11 Mathematics Course Book and the answers are on Page 352 & 353.

From the Year 11 Mathematics Course Book, enlarge each object from the centre by the given scale factor. Label the image A′, B′ and C′ etc. when applicable.

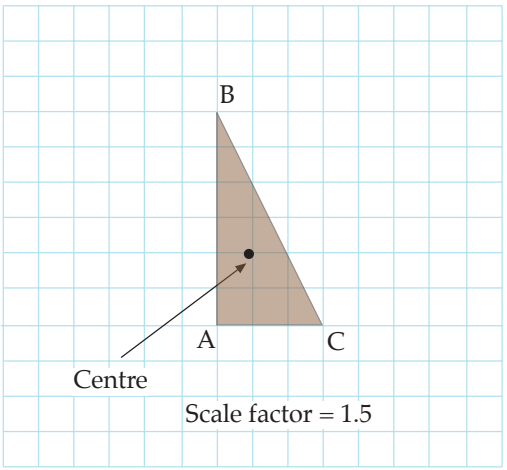
258.



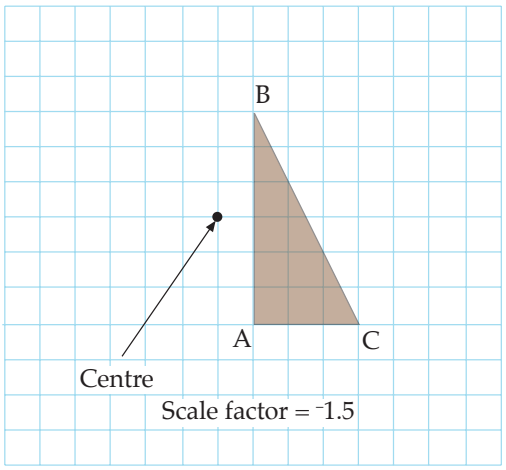
259.



260.

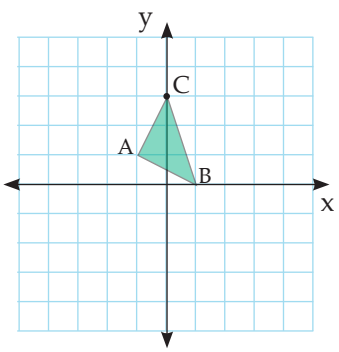


261.

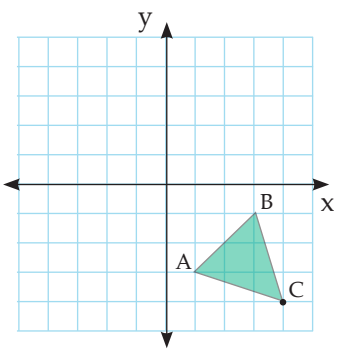


These exercises are from Page 81 of the Year 11 Mathematics Course Book and the answers are on Page 353.

262.



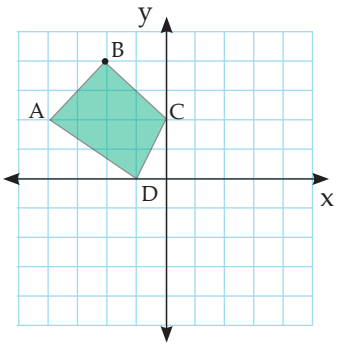
263.



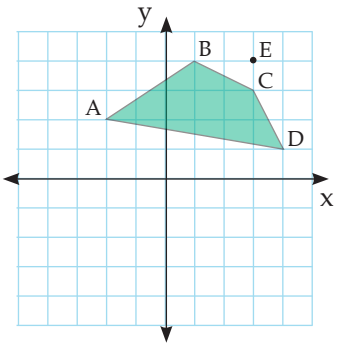
These exercises are from Page 81 of the Year 11 Mathematics Course Book and the answers are on Page 353.

From the Year 11 Mathematics Course Book, enlarge each object from the centre by the given scale factor. Label the image A′, B′ and C′ etc. when applicable.

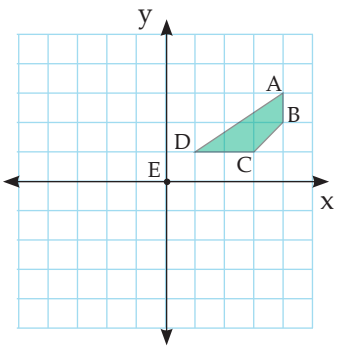
264.



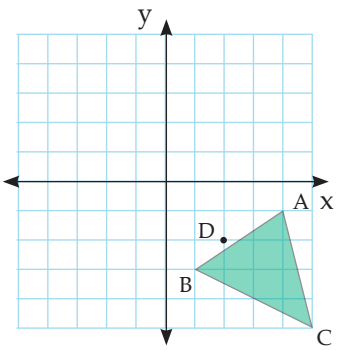
265.



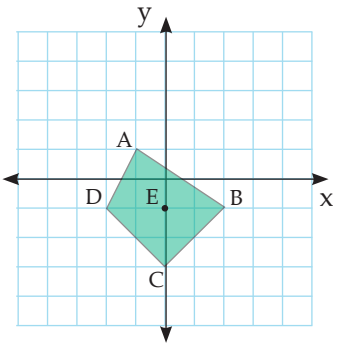
266.



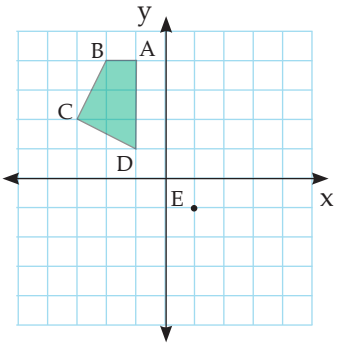
267.



268.



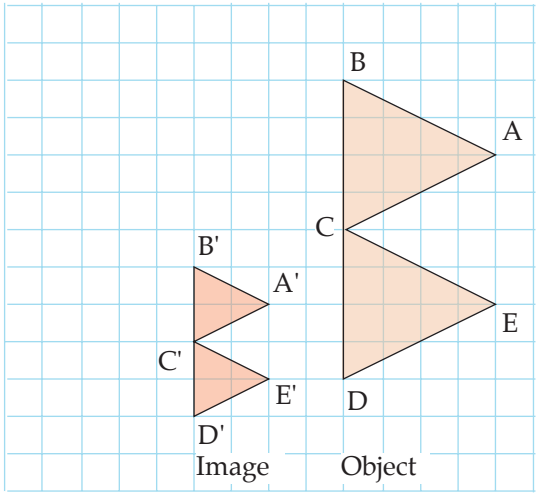
269.



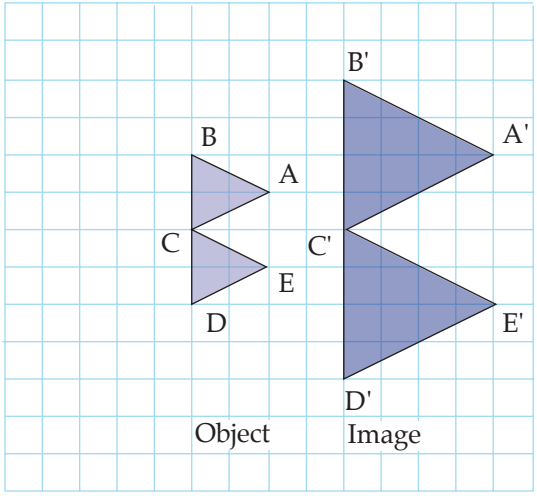
These exercises are from Page 82 of the Year 11 Mathematics Course Book and the answers are on Page 353.

From the Year 11 Mathematics Course Book, describe the enlargement that maps the object to the image and mark in the centre.

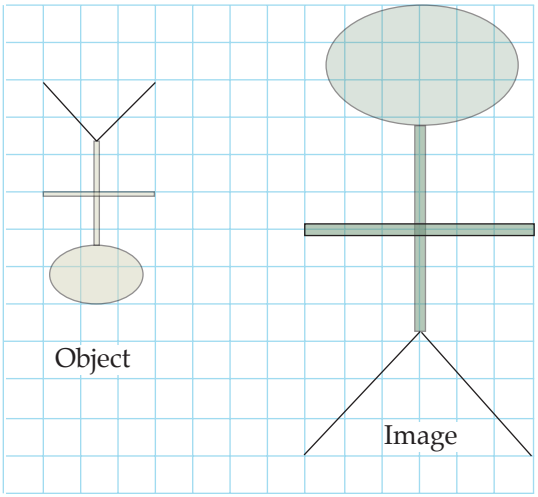
270.



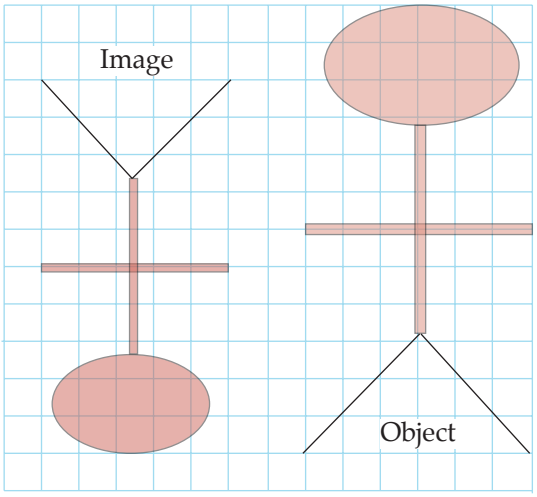
271.



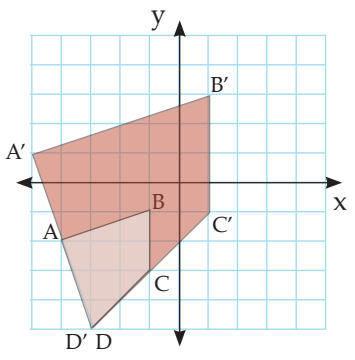
272.



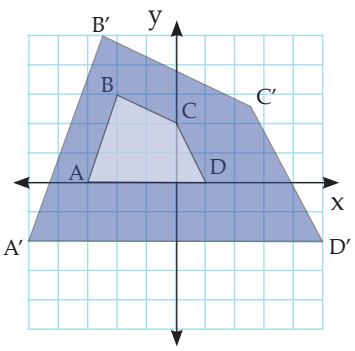
273.



274.

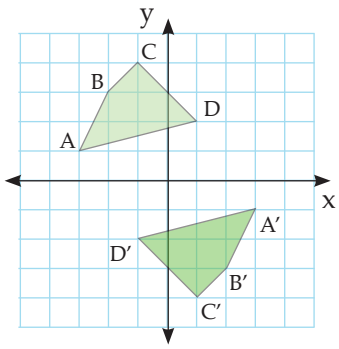


275.

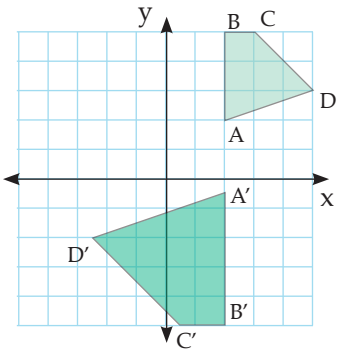


These exercises are from Page 82 of the Year 11 Mathematics Course Book and the answers are on Page 353.

276.

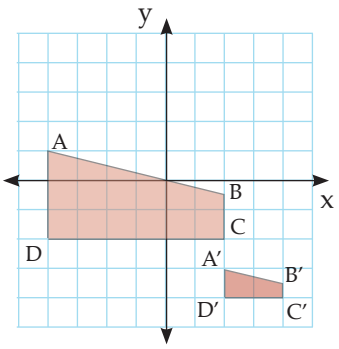


277.

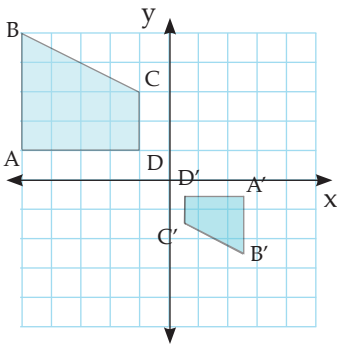


These exercises are from Page 83 of the Year 11 Mathematics Course Book and the answers are on Page 353 & 354.

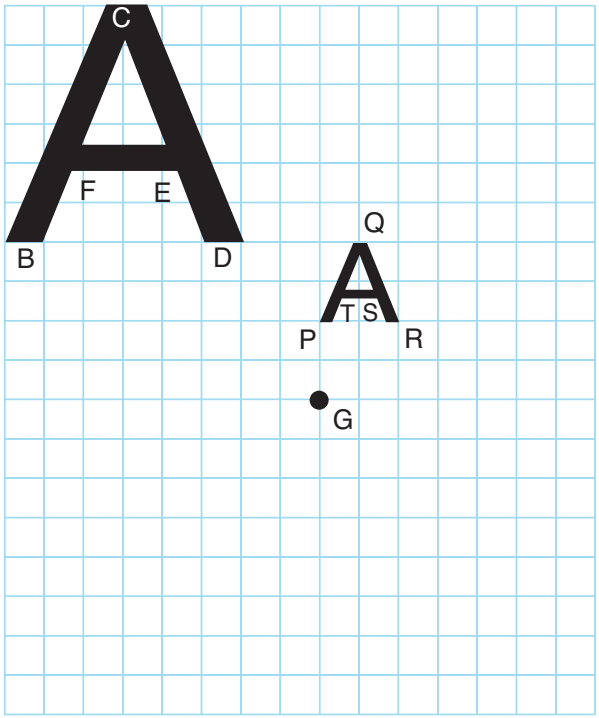
278.



279.



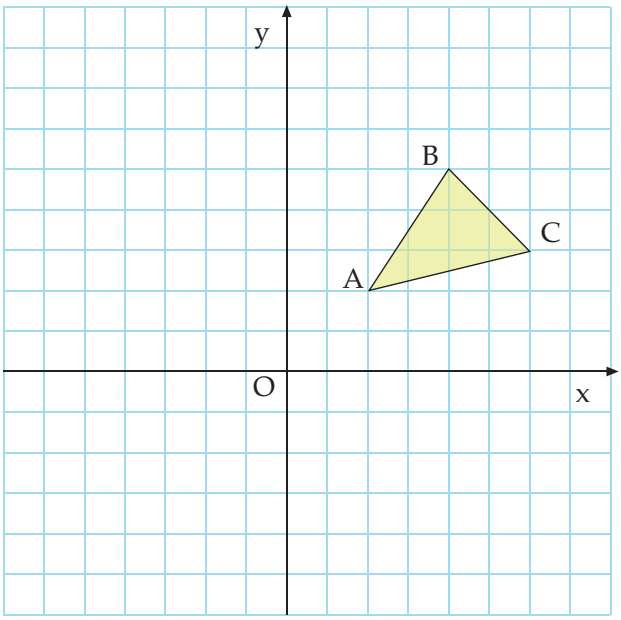
280. a), b), c), d), e) and f)



These exercises are from Page 83 of the Year 11 Mathematics Course Book and the answers are on Page 354.

From the Year 11 Mathematics Course Book, answer the questions.

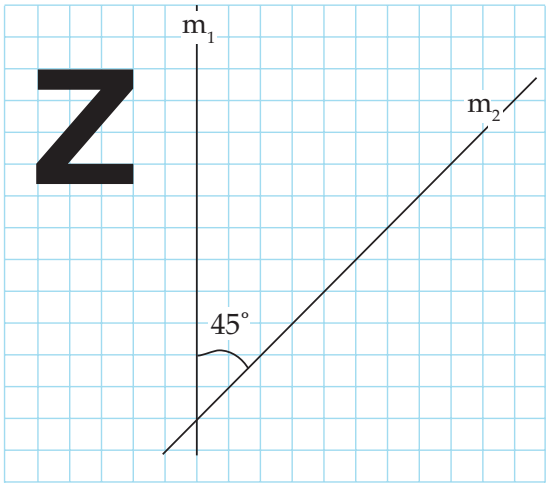
281. a), b), c) and d)



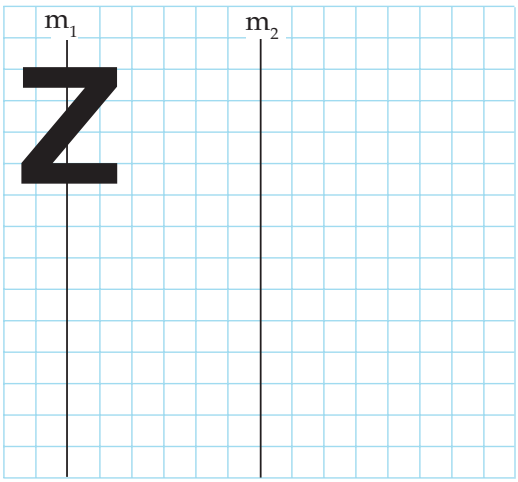
These exercises are from Page 84 of the Year 11 Mathematics Course Book and the answers are on Page 354.

282. a) and b)

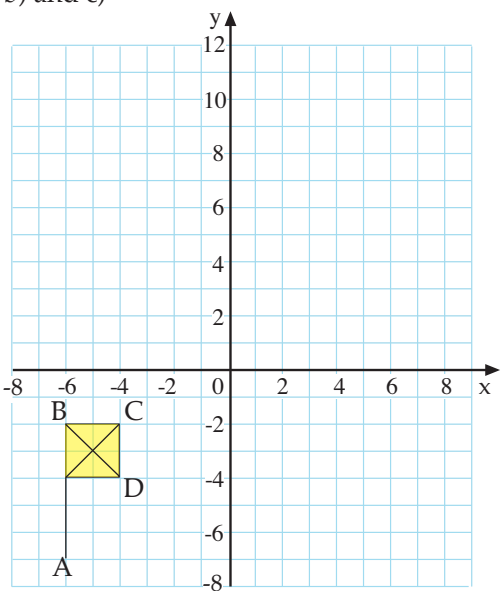
a)



b)

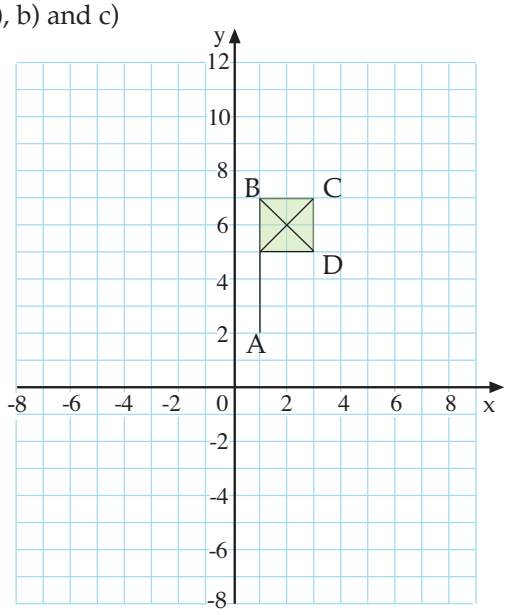


283. a), b) and c)



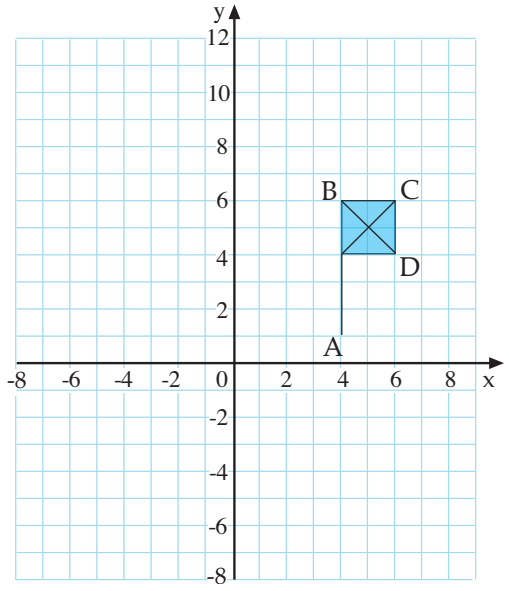
These exercises are from Page 84 of the Year 11 Mathematics Course Book and the answers are on Page 354.

284. a), b) and c)

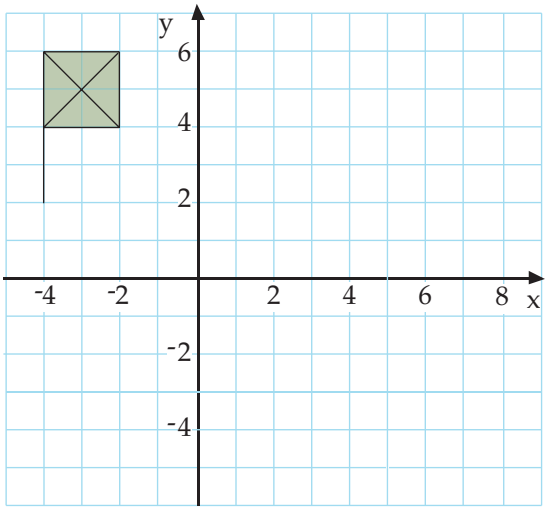


These exercises are from Page 85 of the Year 11 Mathematics Course Book and the answers are on Page 354.

285. a), b) and c)

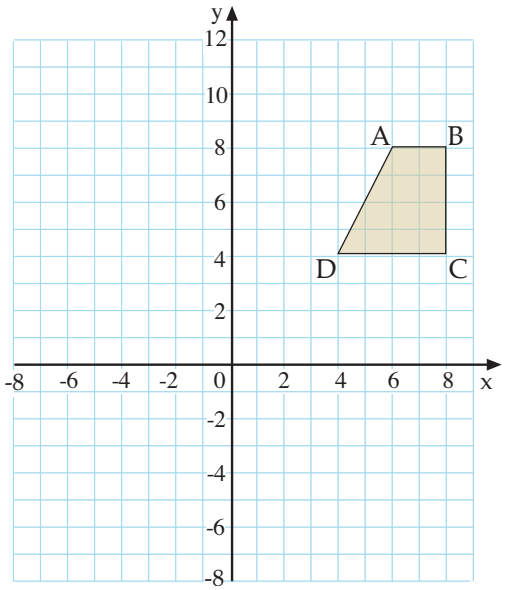


286. a), b), c) and d)

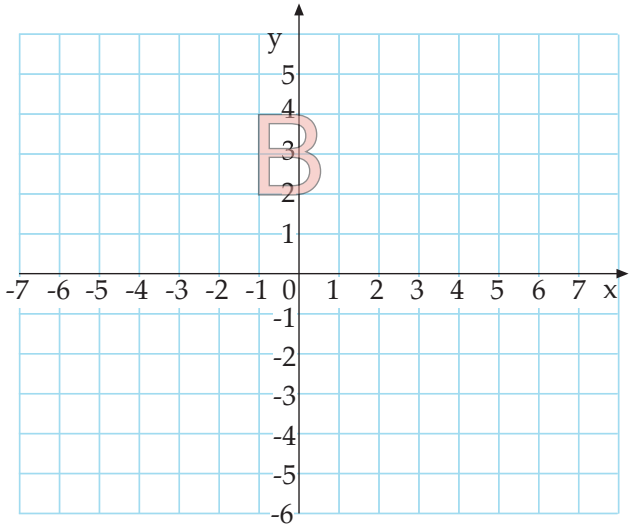


These exercises are from Page 85 of the Year 11 Mathematics Course Book and the answers are on Page 354.

287. a), b), c) and d)



288. a), b) and c)



These exercises are from Page 88 of the Year 11 Mathematics Course Book and the answers are on Page 354 & 355.

From the Year 11 Mathematics Course Book, answer the compass directions and bearing questions.

289. a)

b)

c)

d)

e)

f)

g)

h)

i)

j)

k)

290. a)

b)

c)

d)

e)

f)

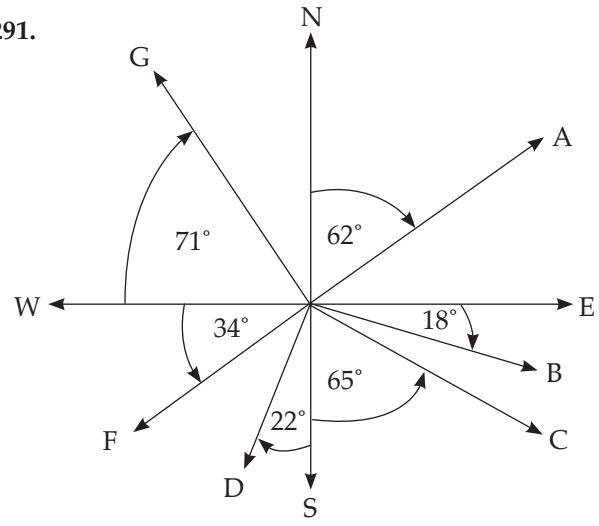
g)

h)

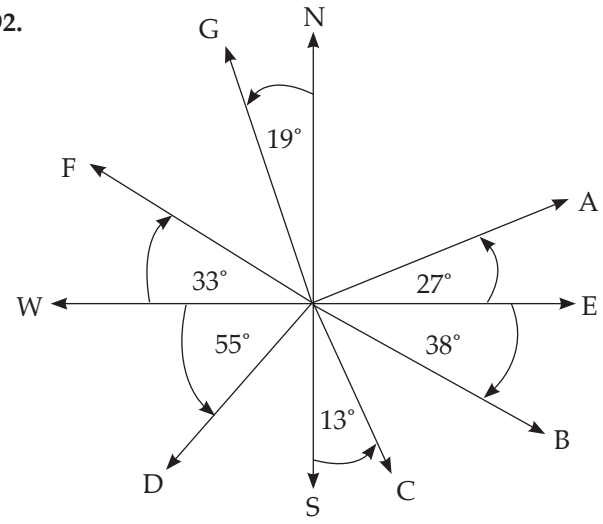
These exercises are from Page 88 of the Year 11 Mathematics Course Book and the answers are on Page 355.

From the Year 11 Mathematics Course Book, give the true bearing and compass bearing of A, B, C, D, F and G.

291.

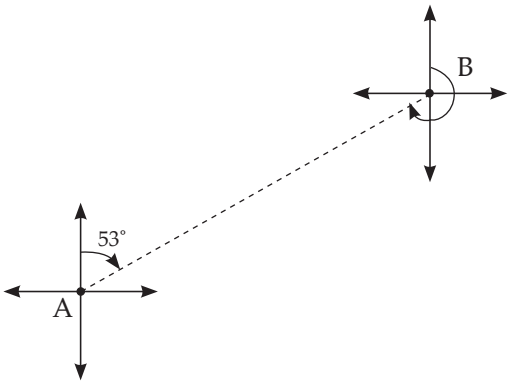


292.

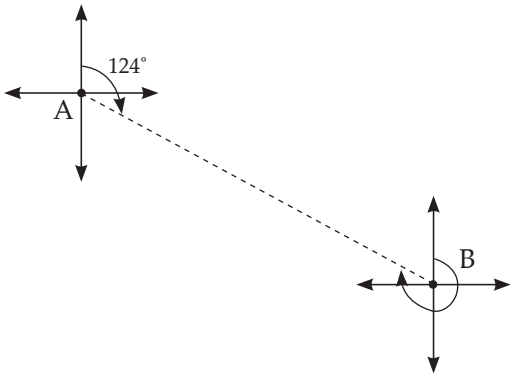


From the Year 11 Mathematics Course Book, give the direction of each point relative to the other using true bearings.

293.

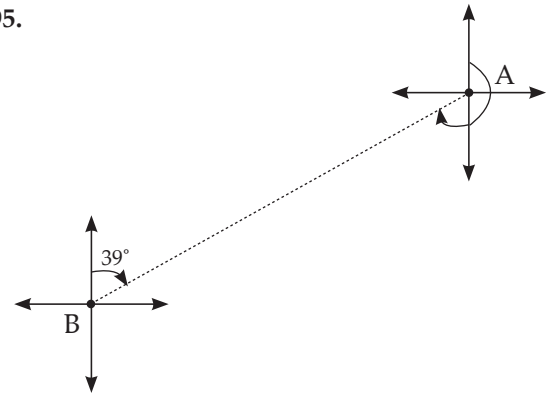


294.

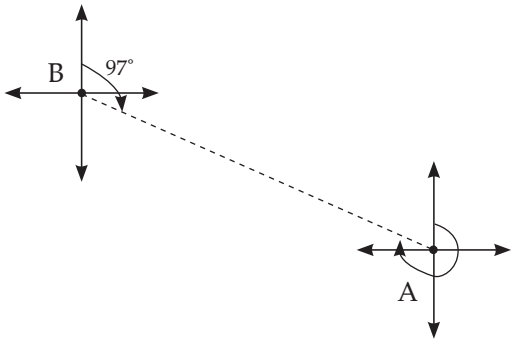


These exercises are from Page 89 of the Year 11 Mathematics Course Book and the answers are on Page 355.

295.

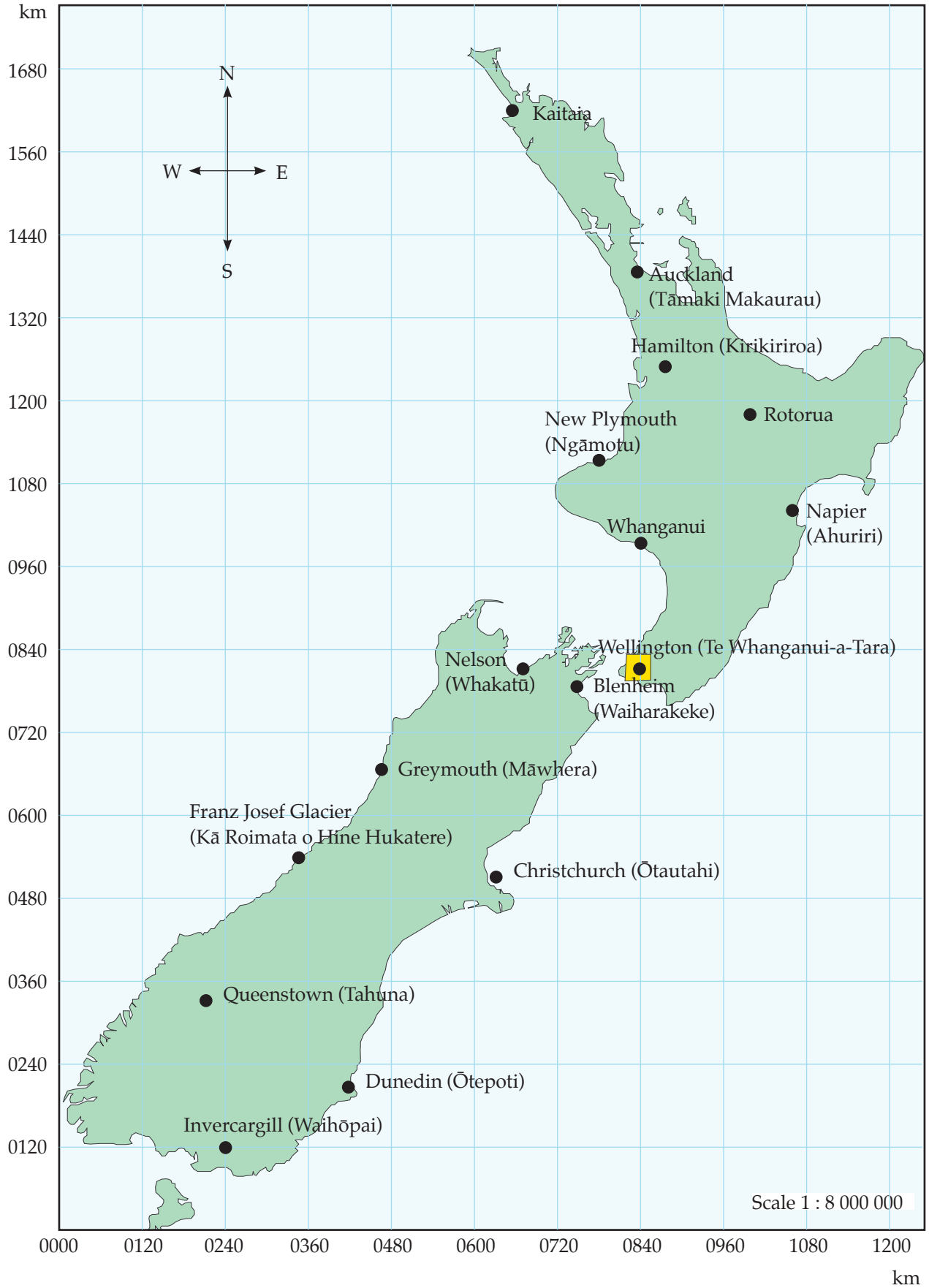


296.



These exercises are from Page 91 of the Year 11 Mathematics Course Book and the answers are on Page 355.

From the Year 11 Mathematics Course Book, study the map of New Zealand below and answer the questions.



These exercises are from Page 92 of the Year 11 Mathematics Course Book and the answers are on Page 355.

297.

298.

299.

300.

301.

302.

303.

304.

305.

306.

307.

308.

309.

310.

311.

312.

313. From the Year 11 Mathematics Course Book, study the map of part of Australia below and answer the questions. Grid references are given as 4 digits (2 lots of 2), e.g. Sydney has the reference 6122. The scale is 1 cm : 100 km.

These exercises are from Page 93 of the Year 11 Mathematics Course Book and the answers are on Page 355.

a) b)

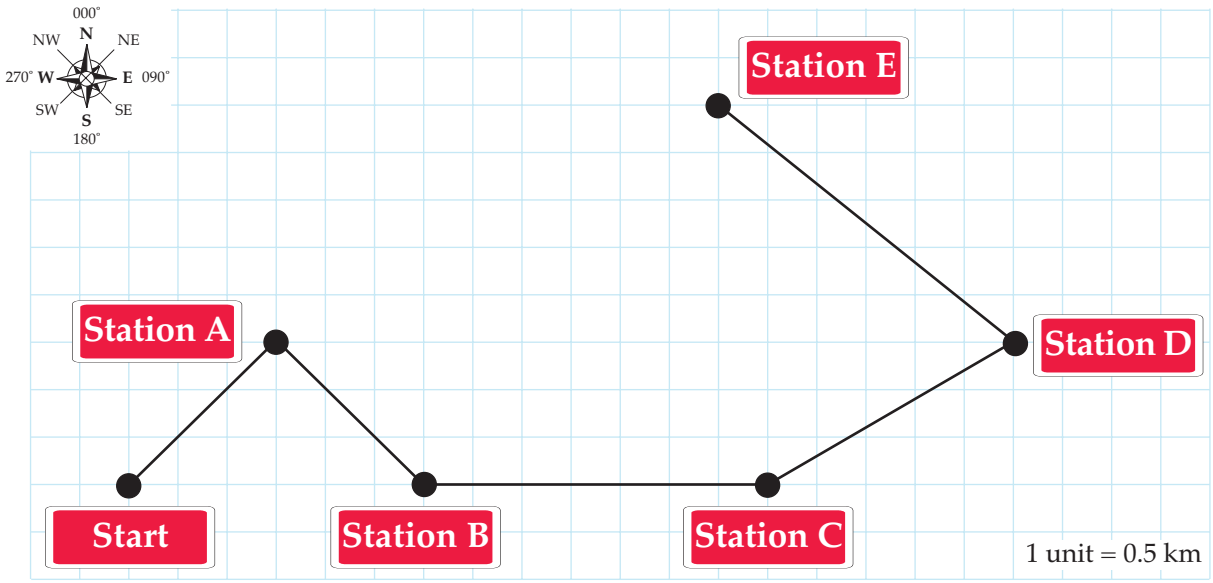
c) d)

e) f)

g) h)

i) j)

314. From the Year 11 Mathematics Course Book, study the map of the orienteering course below and answer the questions.



a) b)

c) d)

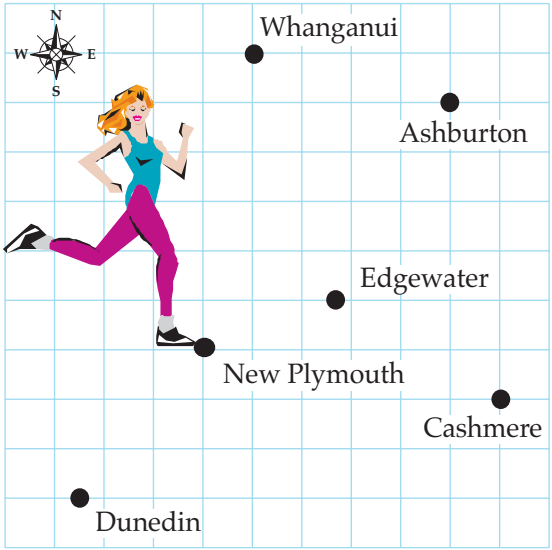
e) f)

g) h)

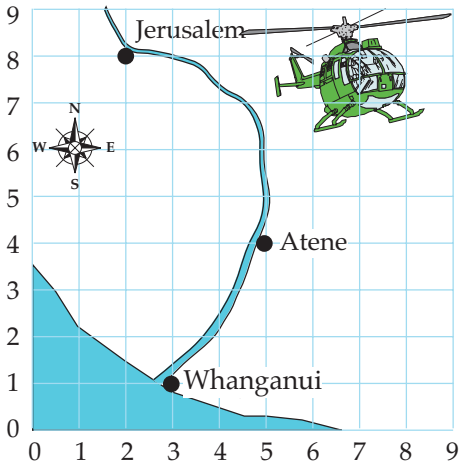
These exercises are from Page 94 of the Year 11 Mathematics Course Book and the answers are on Page 355.

From the Year 11 Mathematics Course Book, answer the scale diagrams and bearing questions.

315. a), b), c), d) and e)

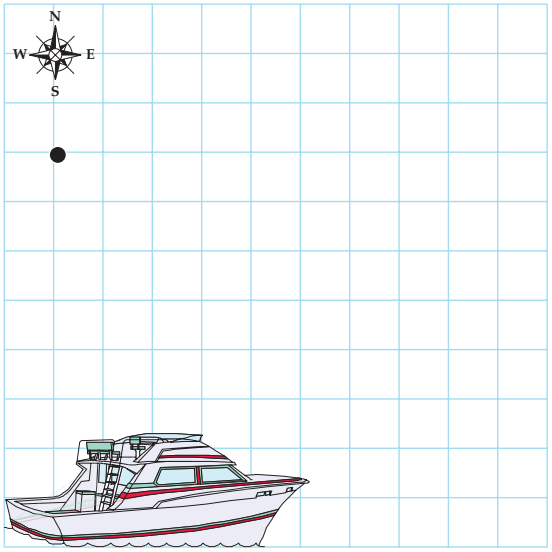


316. a), b) and c)



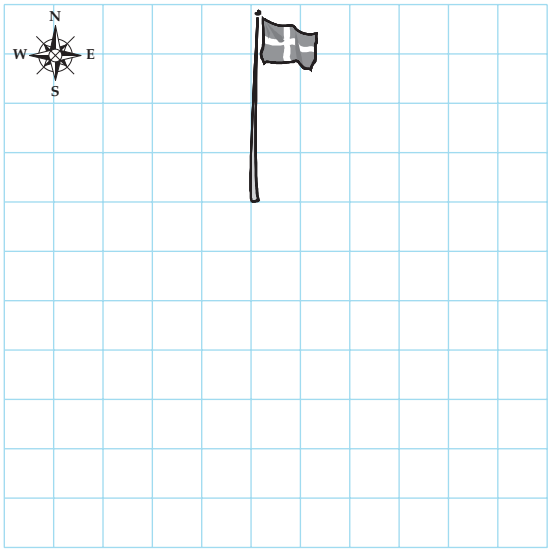
These exercises are from Page 95 of the Year 11 Mathematics Course Book and the answers are on Page 355.

317.

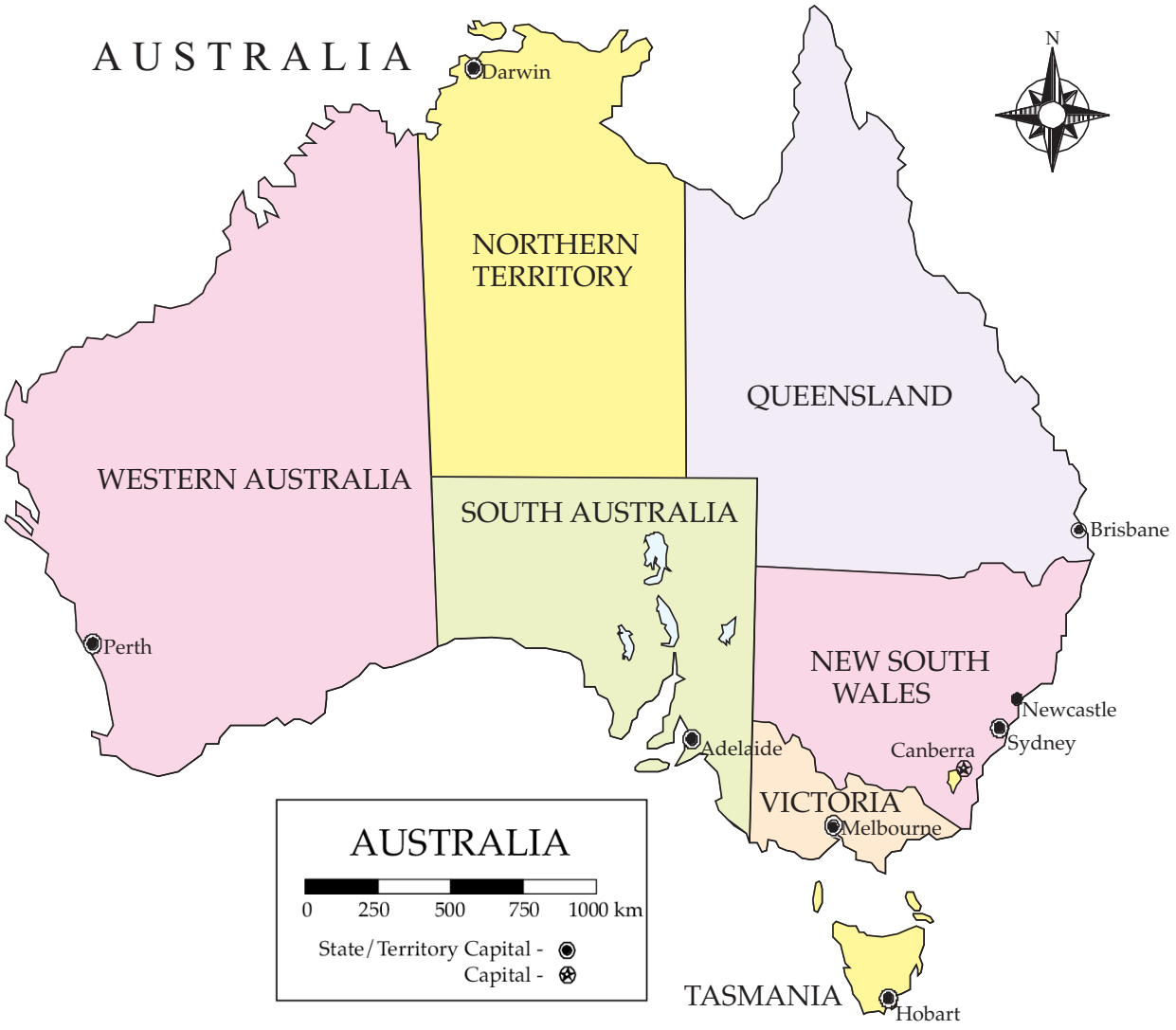


These exercises are from Page 95 of the Year 11 Mathematics Course Book and the answers are on Page 355.

318.



319. From the Year 11 Mathematics Course Book, study the map of Australia below and answer the questions.



These exercises are from Page 96 of the Year 11 Mathematics Course Book and the answers are on Page 355.

a)

b)

c)

d)

e)

f)

g)

Chapter 3

Number

- order of operations
- rounding, rounding sensibly
- estimation
- working with numbers in standard form, and moving flexibly between standard form and ordinary form
- percentages, percentage change, increasing and decreasing, original amounts, mark-up, discount, GST
- ratios and rates
- powers and roots, including fractional and negative powers.

This topic may contribute to the assessment of:

AS1.2 (91945) Explore mathematical problems that relate to life in Aotearoa New Zealand or the Pacific (Internal – 5 credits)

and build knowledge for

AS1.4 (91947) Demonstrate mathematical reasoning (External – 5 credits)

These exercises are from Page 99 of the Year 11 Mathematics Course Book and the answers are on Page 356.

From the Year 11 Mathematics Course Book, evaluate the following using manual methods or your calculator.

1. **2.** **3.** **4.**

5. **6.** **7.** **8.**

9. **10.** **11.** **12.**

13. **14.** **15.** **16.**

17. **18.** **19.** **20.**

21. **22.** **23.** **24.**

25. **26.** **27.** **28.**

29. Quest. $= 71 - \sqrt{36} \times 8 + 7 \times (4 - 2^2) - 3$

$= 71 - 6 \times 8 + 7 \times (4 - 4) - 3$

$= 71 - 6 \times 15 \times 0 - 3$

$= 71 - 90 \times 0 - 3$

$= 74$

30. Quest. $= 3^2 + \sqrt{9} - 4^2 + 5 \times (5 - 3)^2 - 2$

$= 9 + 3 - 16 + 5 \times 4 - 2$

$= 9 + 3 - 16 + 5 \times 2$

$= 9 + 3 - 16 + 10$

$= 12 - 16 + 10$

$= {}^{-}4 + 10$

$= 6$

These exercises are from Page 101 of the Year 11 Mathematics Course Book and the answers are on Page 356.

From the Year 11 Mathematics Course Book, round to the precision indicated in brackets.

31. **32.** **33.** **34.**

35. **36.** **37.** **38.**

39. **40.** **41.** **42.**

43. **44.** **45.** **46.**

These exercises are from Page 102 of the Year 11 Mathematics Course Book and the answers are on Page 356.

From the Year 11 Mathematics Course Book, complete the calculations involving the measurements and round your answer appropriately. Units have been deliberately ignored.

47. **48.** **49.** **50.**

51. **52.** **53.** **54.**

From the Year 11 Mathematics Course Book, complete the measurement calculations, rounding your answer appropriately and stating the units.

55. **56.**

57. **58.**

59. **60.**

These exercises are from Page 102 of the Year 11 Mathematics Course Book and the answers are on Page 356.

61. a), b), c), d), e), f) and g)

These exercises are from Page 103 of the Year 11 Mathematics Course Book and the answers are on Page 356.

From the Year 11 Mathematics Course Book, estimate the answer.

62. **63.** **64.** **65.**

66. **67.** **68.** **69.**

70. **71.**

72. **73.**

74. **75.**

76. **77.**

These exercises are from Page 103 of the Year 11 Mathematics Course Book and the answers are on Page 356.

78.

79.

80.

81.

These exercises are from Page 104 of the Year 11 Mathematics Course Book and the answers are on Page 356.

From the Year 11 Mathematics Course Book, write in standard form, calculating the answer first if required.

82.

83.

84.

85.

86.

87.

88.

89.

90.

91.

92.

93.

These exercises are from Page 105 of the Year 11 Mathematics Course Book and the answers are on Page 357.

94.

95.

96.

97.

98.

99.

100.

101.

These exercises are from Page 105 of the Year 11 Mathematics Course Book and the answers are on Page 357.

102. **103.** **104.** **105.**

106. **107.** **108.** **109.**

From the Year 11 Mathematics Course Book, calculate the answer to each of the problems, rounding your answer appropriately.

110. **111.**

112. **113.**

114. **115.**

116. **117.**

These exercises are from Page 105 of the Year 11 Mathematics Course Book and the answers are on Page 357.

118. a), b), c), d), e), f), g) and h)

These exercises are from Page 106 of the Year 11 Mathematics Course Book and the answers are on Page 357.

From the Year 11 Mathematics Course Book, write the percentages as simplified fractions.

119. **120.** **121.** **122.**

123. **124.** **125.** **126.**

These exercises are from Page 107 of the Year 11 Mathematics Course Book and the answers are on Page 357.

From the Year 11 Mathematics Course Book, write as percentages.

127. **128.** **129.** **130.**

131. **132.** **133.** **134.**

From the Year 11 Mathematics Course Book, calculate the percentages.

135. **136.** **137.** **138.**

139. **140.** **141.** **142.**

These exercises are from Page 107 of the Year 11 Mathematics Course Book and the answers are on Page 357.

From the Year 11 Mathematics Course Book, answer the questions.

143.

144.

145.

146.

147.

148.

149.

150.

151.

152.

153. a), b), c) and d)

These exercises are from Page 109 of the Year 11 Mathematics Course Book and the answers are on Page 357.

From the Year 11 Mathematics Course Book, answer the percentage questions.

154.

155.

156.

157.

158.

159.

160.

161.

162.

163.

164.

165.

166.

167.

These exercises are from Page 110 of the Year 11 Mathematics Course Book and the answers are on Page 357.

168.

169.

170.

171.

172.

173.

174.

175.

176.

177.

178. a), b), c), d) and e)

These exercises are from Page 110 of the Year 11 Mathematics Course Book and the answers are on Page 358.

179. a), b), c), and d)

These exercises are from Page 111 of the Year 11 Mathematics Course Book and the answers are on Page 358.

180.

181.

182.

183. a), b) and c)

184. a), b) and c)

	Year 1	Year 2	Year 3	Year 4	Year 5
Option 1	$5450				
Option 2	$275				

These exercises are from Page 113 of the Year 11 Mathematics Course Book and the answers are on Page 358.

From the Year 11 Mathematics Course Book, simplify each ratio as much as possible. The final ratio should consist of whole numbers with the same units. Units should not be given as part of the answers.

185. **186.** **187.** **188.**

189. **190.** **191.** **192.**

193. **194.** **195.** **196.**

197. **198.** **199.** **200.**

From the Year 11 Mathematics Course Book, find the unknown variable.

201. **202.** **203.** **204.**

From the Year 11 Mathematics Course Book, share each quantity in the given ratio.

205. **206.** **207.** **208.**

209. **210.** **211.** **212.**

213. **214.**

215. **216.**

These exercises are from Page 113 of the Year 11 Mathematics Course Book and the answers are on Page 358.

217.

218.

219.

220.

221. a), b), c), d), e), f) and g)

These exercises are from Page 114 of the Year 11 Mathematics Course Book and the answers are on Page 358.

From the Year 11 Mathematics Course Book, answer the questions.

222.

223.

224.

225.

These exercises are from Page 114 of the Year 11 Mathematics Course Book and the answers are on Page 358.

226.

227.

228.

229.

230.

231.

232.

233.

These exercises are from Page 116 of the Year 11 Mathematics Course Book and the answers are on Page 358.

From the Year 11 Mathematics Course Book, answer the questions.

234. a), b) and c)

235. a), b) and c)

These exercises are from Page 116 of the Year 11 Mathematics Course Book and the answers are on Page 358.

236. a), b) and c)

237. a), b) and c)

238. a) and b)

239. a) and b)

240. a), b) and c)

241. a), b) and c)

242. a) and b)

243. a), b) and c)

These exercises are from Page 116 of the Year 11 Mathematics Course Book and the answers are on Page 358.

244. a), b) and c)

245. a), b) and c)

These exercises are from Page 117 of the Year 11 Mathematics Course Book and the answers are on Page 359.

246. a), b) and c)

247.

248.

These exercises are from Page 118 of the Year 11 Mathematics Course Book and the answers are on Page 359.

From the Year 11 Mathematics Course Book, evaluate using your calculator. Give your answer as a fraction where possible.

249.

250.

251.

252.

These exercises are from Page 118 of the Year 11 Mathematics Course Book and the answers are on Page 359.

253. **254.** **255.** **256.**

257. **258.** **259.** **260.**

261. **262.** **263.** **264.**

265. **266.** **267.** **268.**

269. **270.** **271.** **272.**

273. **274.** **275.** **276.**

From the Year 11 Mathematics Course Book, estimate (between two consecutive whole numbers) the answer.

277. **278.** **279.** **280.**

281. **282.** **283.** **284.**

From the Year 11 Mathematics Course Book, evaluate, rounding your answer appropriately.

285. **286.** **287.** **288.**

289. **290.** **291.** **292.**

293. **294.** **295.** **296.**

These exercises are from Page 120 of the Year 11 Mathematics Course Book and the answers are on Page 359.

From the Year 11 Mathematics Course Book, evaluate (leave fractional answers as fractions).

297. **298.** **299.** **300.**

301. **302.** **303.** **304.**

305. **306.** **307.** **308.**

309. **310.** **311.** **312.**

313. **314.** **315.** **316.**

317. **318.** **319.** **320.**

321. **322.** **323.** **324.**

325. **326.**

From the Year 11 Mathematics Course Book, evaluate using your calculator.

327. **328.** **329.** **330.**

332. **333.** **334.** **335.**

336. **337.** **338.**

These exercises are from Page 120 of the Year 11 Mathematics Course Book and the answers are on Page 359.

From the Year 11 Mathematics Course Book, write as positive exponents under a radical sign.

339. **340.** **341.** **342.**

343. **344.** **345.** **346.**

347. **348.** **349.** **350.**

CHAPTER 4

ALGEBRA

- using manipulation of equations and inequations to solve problems
- using technology to solve problems
- forming, rearranging, and using formulae
- expanding and factorising up to quadratic polynomials
- accurately solving more complex linear and quadratic equations, showing working
- algebraically solving systems of two linear equations in two-dimensional space, and geometrically interpreting the solution
- exploring situations using a variety of representations such as patterns, equations, tables, and graphs
- graphing linear and quadratic functions
- finding the equation for the line between two points
- finding the equation of a parabola
- finding equations for parallel lines, including horizontal and vertical lines
- graphing linear and quadratic functions and interpreting x-intercepts, the y intercept, and key features in relation to the equation or the situation
- operating on numbers, with real number exponents by applying exponent rules, including evaluation integer exponents, excluding complex numbers
- operating on algebraic fractions with numeric denominators
- exploring and using relative change in two variables represented using equations, tables, and graphs, within linear and quadratic relationships
- finding optimal solutions which maximise or minimise a quantity
- dealing with quadractic inequalities
- dealing with exponential relationships, patterns, graphing and equations.

This topic may contribute to the assessment of:

AS1.2 (91945) Explore mathematical problems that relate to life in Aotearoa New Zealand or the Pacific (Internal – 5 credits)

and build knowledge for

AS1.4 (91947) Demonstrate mathematical reasoning (External – 5 credits)

These exercises are from Page 123 of the Year 11 Mathematics Course Book and the answers are on Page 360.

From the Year 11 Mathematics Course Book, simplify the algebraic expressions.

1. **2.** **3.** **4.**

5. **6.** **7.** **7.**

9. **10.** **11.** **12.**

13. **14.** **15.** **16.**

17. **18.** **19.** **20.**

From the Year 11 Mathematics Course Book, find the missing term.

21. **22.**

23. **24.**

25. **26.**

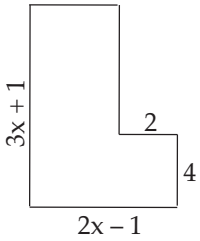
27. **28.**

29. **30.**

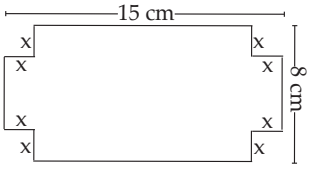
These exercises are from Page 123 of the Year 11 Mathematics Course Book and the answers are on Page 360.

From the Year 11 Mathematics Course Book, demonstrate your understanding of algebraic addition by answering the questions.

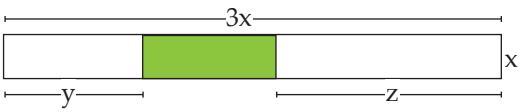
31.



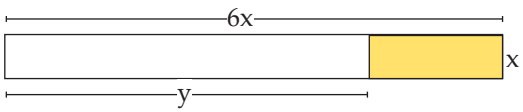
32.



33.



34.



From the Year 11 Mathematics Course Book, form an expression and simplify.

35.

36.

37.

38.

These exercises are from Page 124 of the Year 11 Mathematics Course Book and the answers are on Page 360.

From the Year 11 Mathematics Course Book, demonstrate your understanding of the abstract concept by simplifying the algebraic expressions.

39.

40.

41.

42.

43.

44.

These exercises are from Page 125 of the Year 11 Mathematics Course Book and the answers are on Page 360.

From the Year 11 Mathematics Course Book, simplify the algebraic expressions.

45.

46.

47.

48.

49.

50.

51.

52.

53.

54.

55.

56.

57.

58.

59.

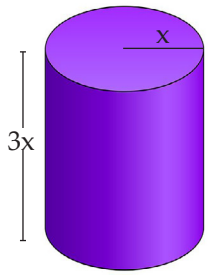
From the Year 11 Mathematics Course Book, answer the questions.

60.

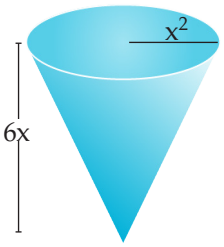
61.

62.

63.



64.



These exercises are from Page 127 of the Year 11 Mathematics Course Book and the answers are on Page 360.

From the Year 11 Mathematics Course Book, simplify the algebraic expressions.

65.

66.

67.

68.

69.

70.

71.

72.

73.

These exercises are from Page 127 of the Year 11 Mathematics Course Book and the answers are on Page 360.

74.

75.

76.

From the Year 11 Mathematics Course Book, simplify the algebraic expressions showing each step.

77.

78.

79.

80.

81.

82.

83.

84.

85.

86.

87.

88.

89.

90.

These exercises are from Page 128 of the Year 11 Mathematics Course Book and the answers are on Page 360.

From the Year 11 Mathematics Course Book, use the exponent relationships to justify each conclusion.

91.

92.

93.

94.

These exercises are from Page 129 of the Year 11 Mathematics Course Book and the answers are on Page 361.

From the Year 11 Mathematics Course Book, simplify the algebraic fractions.

95.

96.

97.

98.

99.

100.

101.

102.

103.

104.

105.

106.

107.

108.

109.

These exercises are from Page 130 of the Year 11 Mathematics Course Book and the answers are on Page 361.

110.

111.

112.

These exercises are from Page 130 of the Year 11 Mathematics Course Book and the answers are on Page 361.

113.

114.

115.

116.

117.

118.

From the Year 11 Mathematics Course Book, solve each problem to find the the value of the unknown variable.

119.

120.

121.

122.

123.

124.

125.

126.

127.

128.

These exercises are from Page 131 of the Year 11 Mathematics Course Book and the answers are on Page 361.

129.

130.

131.

132.

These exercises are from Page 131 of the Year 11 Mathematics Course Book and the answers are on Page 361.

133.

134.

135.

136.

137.

138.

139.

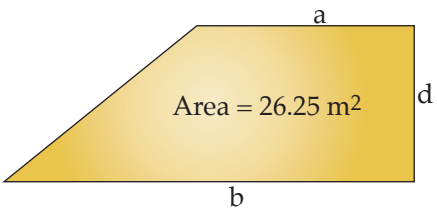
140.

From the Year 11 Mathematics Course Book, for each question you must form an equation and use it to solve the problem and explain the result.

141.

142.

143.



144.

145.

146.

These exercises are from Page 132 of the Year 11 Mathematics Course Book and the answers are on Page 361.

147.

148.

These exercises are from Page 134 of the Year 11 Mathematics Course Book and the answers are on Page 361.

From the Year 11 Mathematics Course Book, solve the linear equations. Applicable working is required.

149.

150.

151.

152.

153.

154.

These exercises are from Page 134 of the Year 11 Mathematics Course Book and the answers are on Page 361.

155.

156.

157.

158.

159.

160.

161.

162.

These exercises are from Page 134 of the Year 11 Mathematics Course Book and the answers are on Page 361.

163.

164.

165.

166.

167.

168.

169.

170.

These exercises are from Page 134 of the Year 11 Mathematics Course Book and the answers are on Page 361 & 362.

171.

172.

173.

These exercises are from Page 135 of the Year 11 Mathematics Course Book and the answers are on Page 362.

From the Year 11 Mathematics Course Book, solve the linear equations. Applicable working is required.

174.

175.

176.

177.

These exercises are from Page 135 of the Year 11 Mathematics Course Book and the answers are on Page 362.

178.

179.

These exercises are from Page 137 of the Year 11 Mathematics Course Book and the answers are on Page 362.

From the Year 11 Mathematics Course Book, form an equation for each and solve.

180.

181.

182.

183.

184.

185.

These exercises are from Page 137 of the Year 11 Mathematics Course Book and the answers are on Page 362.

186.

187.

188.

189.

190.

191.

192.

193.

194.

195.

These exercises are from Page 137 of the Year 11 Mathematics Course Book and the answers are on Page 362.

196.

197.

198.

199.

200.

201.

202.

203.

204.

205.

These exercises are from Page 138 of the Year 11 Mathematics Course Book and the answers are on Page 362.

From the Year 11 Mathematics Course Book, make the variable in brackets the subject of the equation.

206.

207.

208.

209.

210.

211.

212.

213.

214.

215.

These exercises are from Page 138 of the Year 11 Mathematics Course Book and the answers are on Page 362.

216.

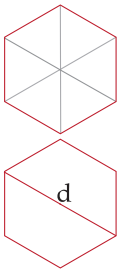
217.

These exercises are from Page 139 of the Year 11 Mathematics Course Book and the answers are on Page 362 & 363.

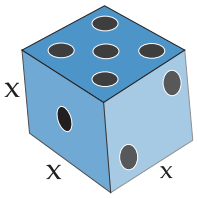
218.

219.

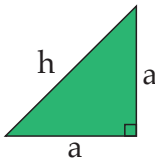
220.



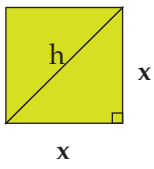
221.



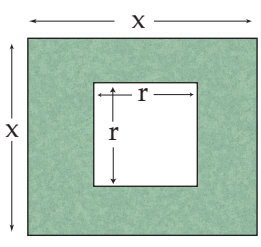
222.



223.

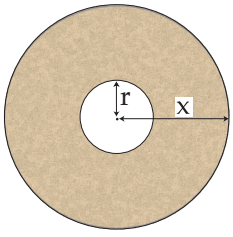


224.



Shaded area = A

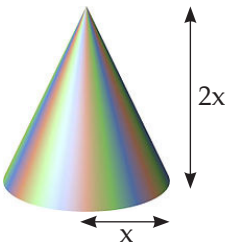
225.



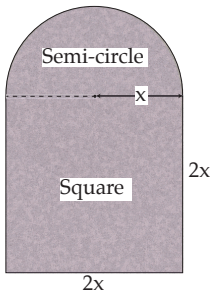
Shaded area = A

These exercises are from Page 139 of the Year 11 Mathematics Course Book and the answers are on Page 363.

226.



227.



These exercises are from Page 142 of the Year 11 Mathematics Course Book and the answers are on Page 363.

From the Year 11 Mathematics Course Book, identify whether each of the relations represented in tabular form are linear, by studying the differences between successive y terms.

228.

x	y	First order differences
−2	−5	
−1	−2	
0	1	
1	4	
2	7	

229.

x	y	First order differences
−2	4	
−1	1	
0	0	
1	1	
2	4	

230.

x	y	First order differences
−2	7	
−1	3	
0	−1	
1	−5	
2	−9	

231.

x	y	First order differences
0	1	
1	2	
2	9	
3	28	
4	65	

232.

x	y	First order differences
−2	−2	
−1	−1	
0	0	
1	1	
2	2	

233.

x	y	First order differences
0	3	
1	3	
2	3	
3	3	
4	3	

234.

x	y	First order differences
−2	2	
−1	−1	
0	−2	
1	−1	
2	2	

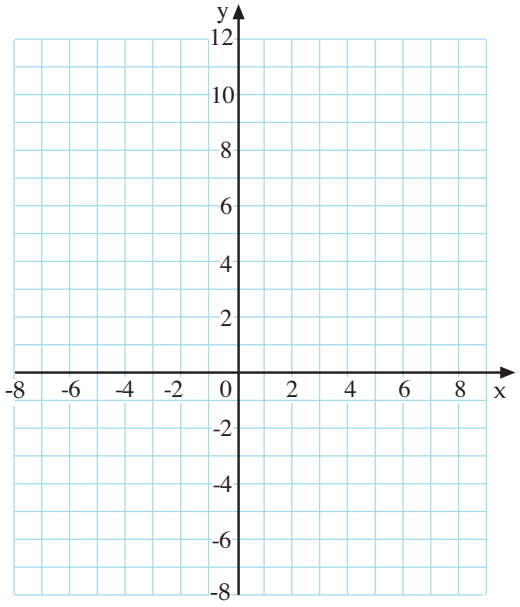
235.

x	y	First order differences
5	30	
4	20	
3	12	
2	6	
1	2	

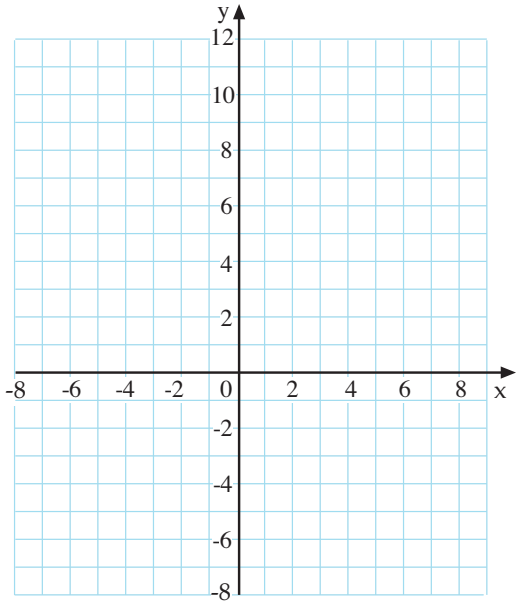
These exercises are from Page 142 of the Year 11 Mathematics Course Book and the answers are on Page 363.

From the Year 11 Mathematics Course Book, by plotting the sets of points on a Cartesian graph, identify whether each set is linear or not.

236. and 237.



238. and 239.



From the Year 11 Mathematics Course Book, by studying the equation identify whether each of the relations are linear or not.

240.

241.

242.

243.

244.

245.

246.

247.

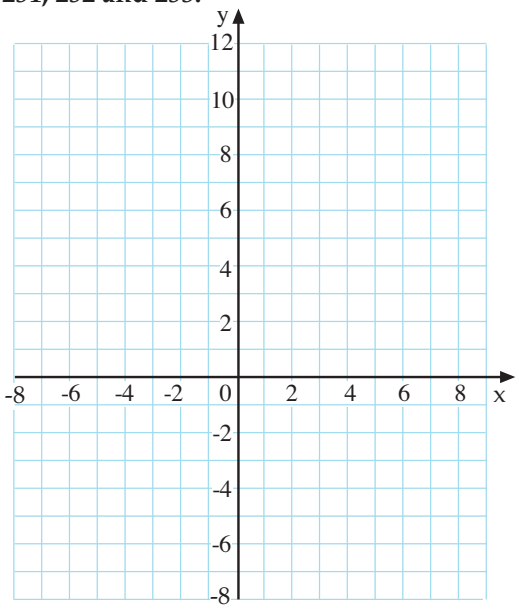
248.

249.

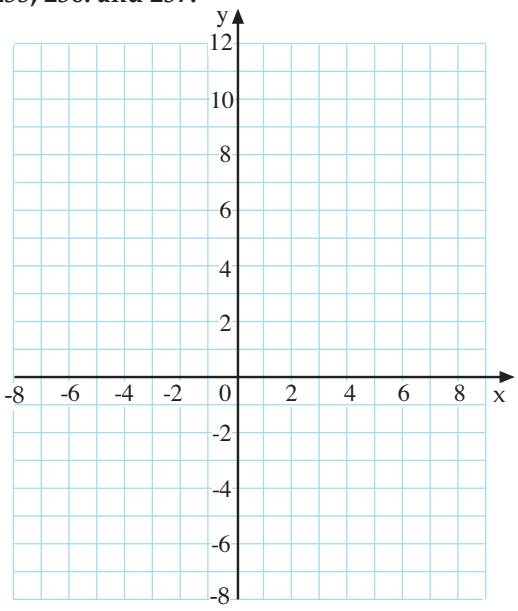
These exercises are from Page 144 of the Year 11 Mathematics Course Book and the answers are on Page 363.

From the Year 11 Mathematics Course Book, sketch the graphs of the following horizontal and vertical lines.

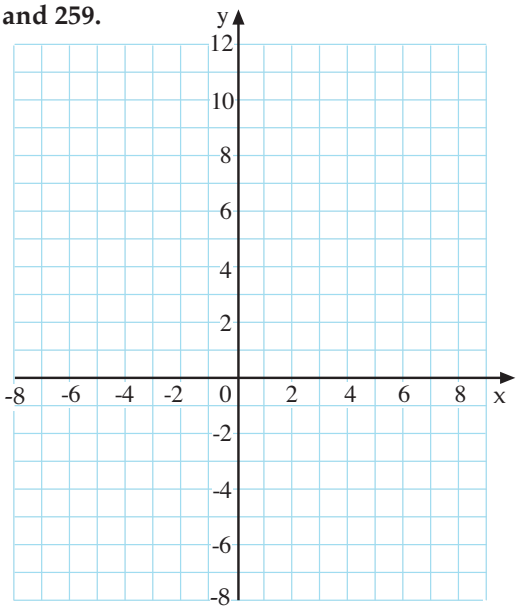
250, 251, 252 and 253.



254, 255, 256. and 257.



258. and 259.



These exercises are from Page 145 of the Year 11 Mathematics Course Book and the answers are on Page 363 & 364.

From the Year 11 Mathematics Course Book, graph the straight lines and calculate the gradient and y intercept. Graph four questions on each set of axes

260. $y = 2x + 1$

x	y

gradient = _____

y intercept = _____

261. $y = 3x - 2$

x	y

gradient = _____

y intercept = _____

262. $y = \frac{-1}{2}x + 6$

x	y

gradient = _____

y intercept = _____

263. $y = x$

x	y

gradient = _____

y intercept = _____

264. $y = -2x + 3$

x	y

gradient = _____

y intercept = _____

265. $y = -x + 1$

x	y

gradient = _____

y intercept = _____

These exercises are from Page 145 of the Year 11 Mathematics Course Book and the answers are on Page 363 & 364.

266. $y = \frac{1}{3}x - 2$

x	y

gradient = _____

y intercept = _____

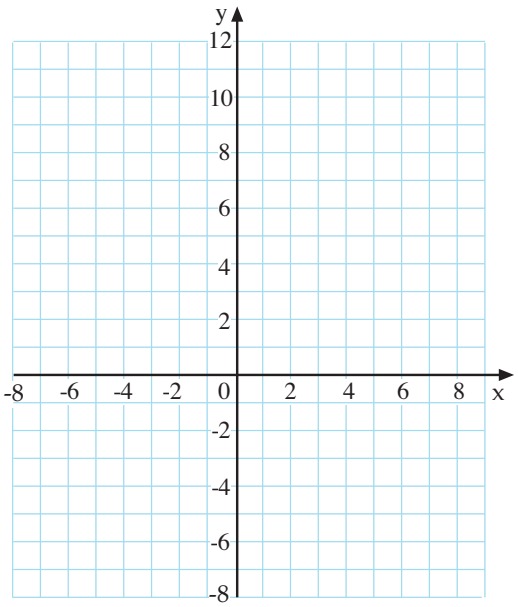
267. $y = 6$

x	y

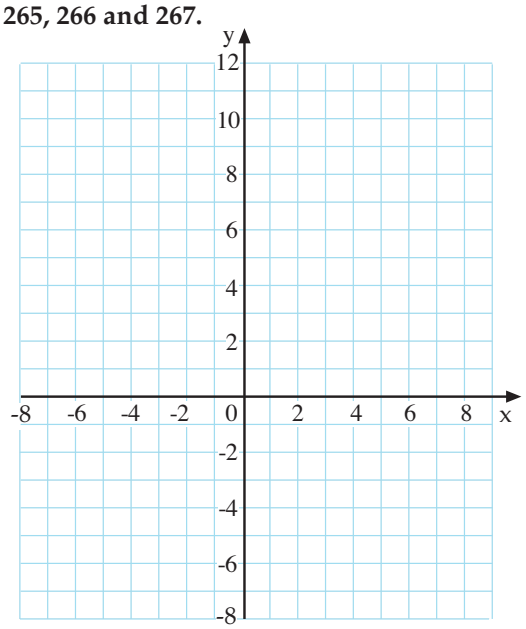
gradient = _____

y intercept = _____

260, 261, 262 and 263.



264, 265, 266 and 267.



These exercises are from Page 147 of the Year 11 Mathematics Course Book and the answers are on Page 364.

From the Year 11 Mathematics Course Book, write down the gradient and y intercept of each line and then sketch the graph.

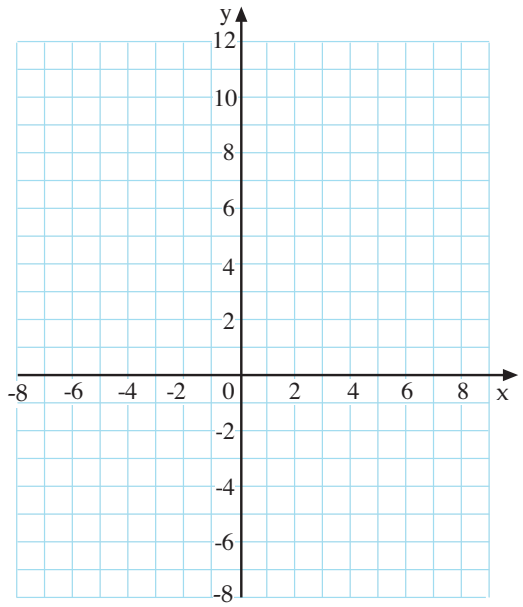
268 and 269.

gradient = _____

y intercept = _____

gradient = _____

y intercept = _____



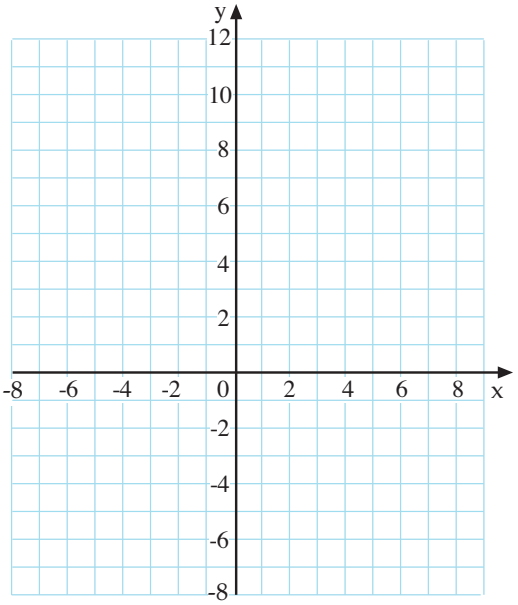
270 and 271.

gradient = _____

y intercept = _____

gradient = _____

y intercept = _____

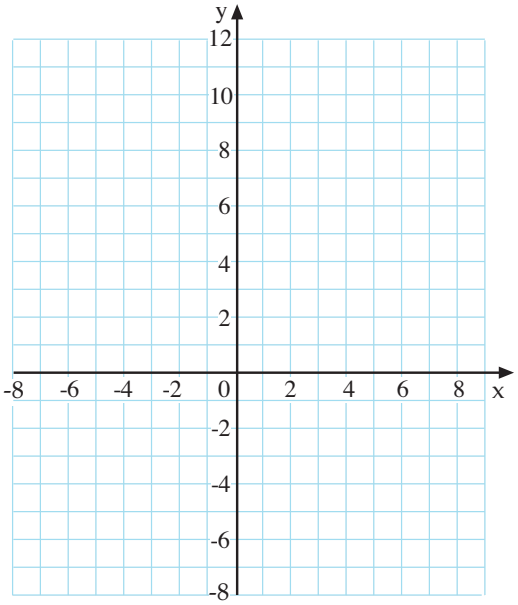


These exercises are from Page 147 of the Year 11 Mathematics Course Book and the answers are on Page 364.

272 and 273.

gradient = _____ gradient = _____

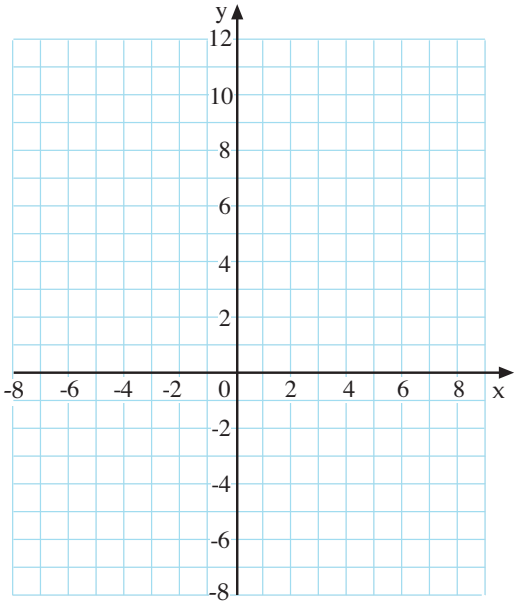
y intercept = _____ y intercept = _____



274 and 275.

gradient = _____ gradient = _____

y intercept = _____ y intercept = _____

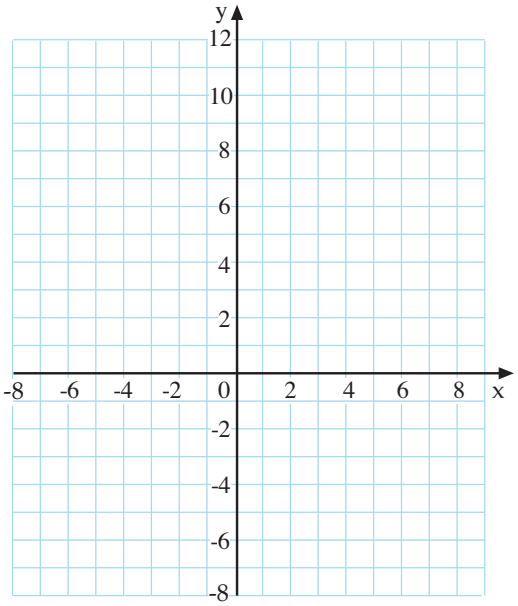


These exercises are from Page 148 of the Year 11 Mathematics Course Book and the answers are on Page 364.

276 and 277.

gradient = _____ gradient = _____

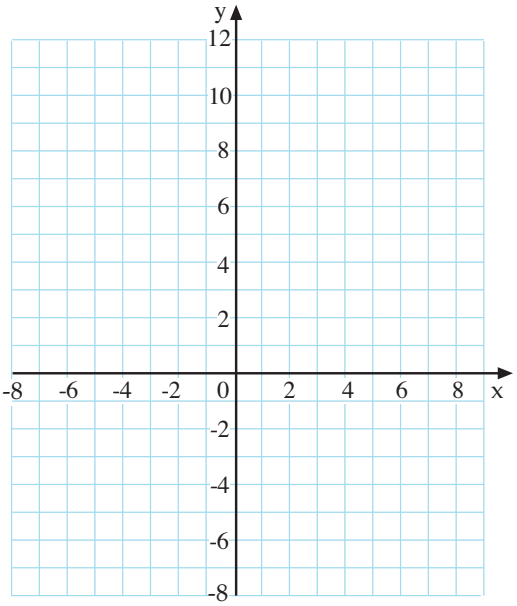
y intercept = _____ y intercept = _____



278 and 279.

gradient = _____ gradient = _____

y intercept = _____ y intercept = _____



These exercises are from Page 148 of the Year 11 Mathematics Course Book and the answers are on Page 364.

From the Year 11 Mathematics Course Book, for each line drawn, find its gradient and y intercept and then give its equation.

280. (A)

gradient = _____

y intercept = _____

Equation: _____

281. (B)

gradient = _____

y intercept = _____

Equation: _____

282. (C)

gradient = _____

y intercept = _____

Equation: _____

283. (D)

gradient = _____

y intercept = _____

Equation: _____

284. (E)

gradient = _____

y intercept = _____

Equation: _____

285. (F)

gradient = _____

y intercept = _____

Equation: _____

286. (G)

gradient = _____

y intercept = _____

Equation: _____

287. (H)

gradient = _____

y intercept = _____

Equation: _____

288. (I)

gradient = _____

y intercept = _____

Equation: _____

289. (J)

gradient = _____

y intercept = _____

Equation: _____

290. (K)

gradient = _____

y intercept = _____

Equation: _____

291. (L)

gradient = _____

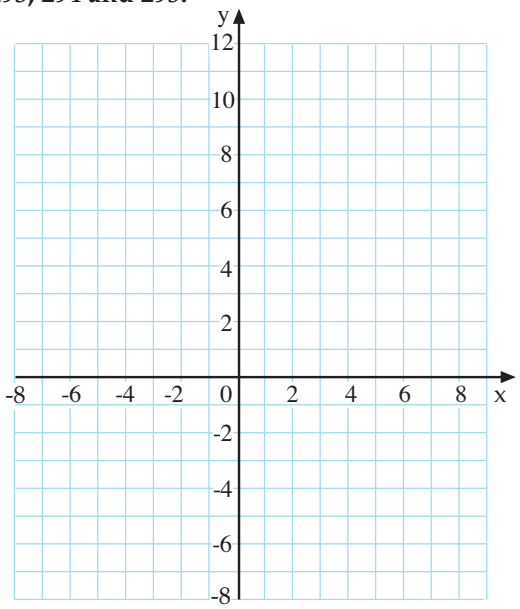
y intercept = _____

Equation: _____

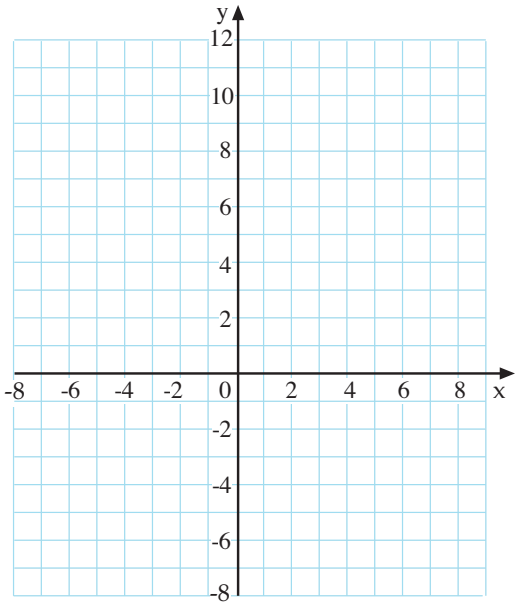
These exercises are from Page 149 of the Year 11 Mathematics Course Book and the answers are on Page 364.

From the Year 11 Mathematics Course Book, sketch four questions on a set of axes and label each graph.

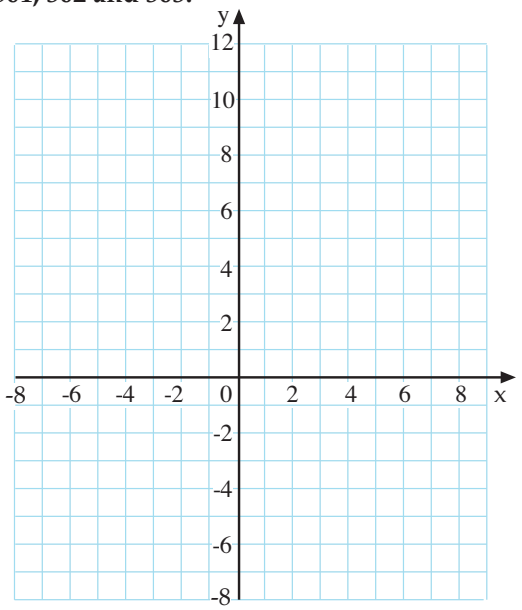
292, 293, 294 and 295.



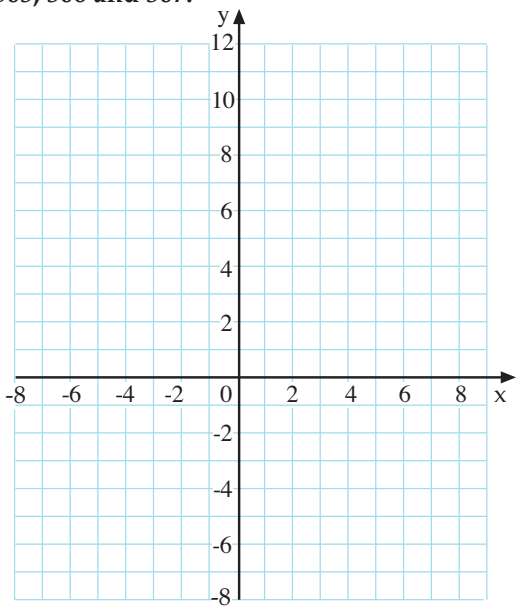
296, 297, 298 and 299.



300, 301, 302 and 303.



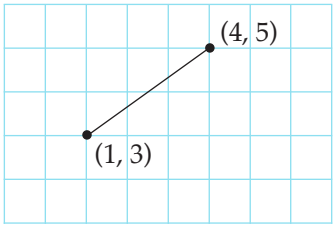
304, 305, 306 and 307.



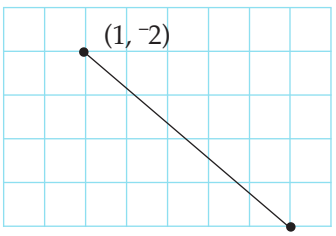
These exercises are from Page 151 of the Year 11 Mathematics Course Book and the answers are on Page 365.

From the Year 11 Mathematics Course Book, for each find the equation of the line in the form $y = mx + c$ or $ax + by + c = 0$.

308.

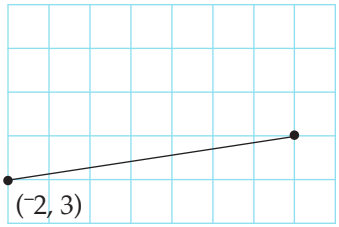


309.



These exercises are from Page 151 of the Year 11 Mathematics Course Book and the answers are on Page 365.

310.



311.

312.

313.

314.

315.

316.

317.

318.

319.

320.

321.

322.

323.

324.

325.

326.

327.

These exercises are from Page 152 of the Year 11 Mathematics Course Book and the answers are on Page 365.

From the Year 11 Mathematics Course Book, for each find the equation of the line in the form $y = mx + c$ or $ax + by + c = 0$.

328.

329.

330.

331.

332.

333.

334.

335.

336.

These exercises are from Page 153 of the Year 11 Mathematics Course Book and the answers are on Page 365.

From the Year 11 Mathematics Course Book, answer the questions.

337. a), b), c), d), e) and f)

338. a), b), c), d), e), f), g) and h)

From the Year 11 Mathematics Course Book, for each, find the equation of the line in the form $ax + by + c = 0$ or $y = mx + c$.

339.

340.

These exercises are from Page 153 of the Year 11 Mathematics Course Book and the answers are on Page 365.

341.

342.

343.

344.

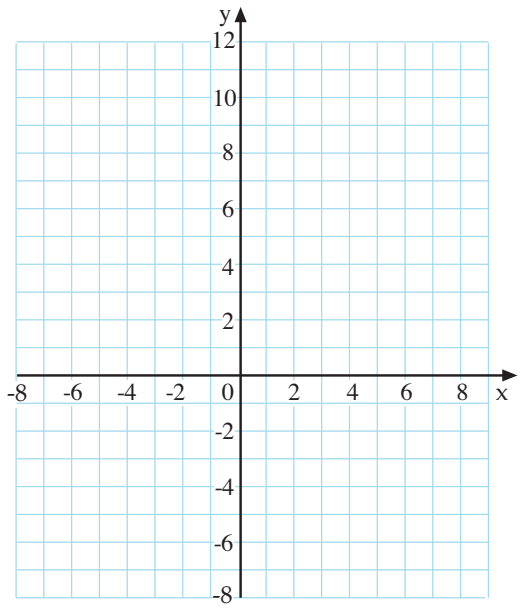
345.

346.

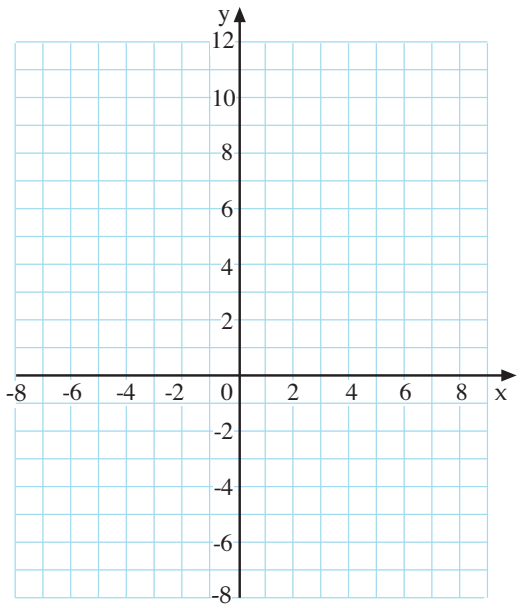
These exercises are from Page 155 of the Year 11 Mathematics Course Book and the answers are on Page 365.

From the Year 11 Mathematics Course Book, graph the pairs of simultaneous equations on the set of axes below and identify the point of intersection.

347.

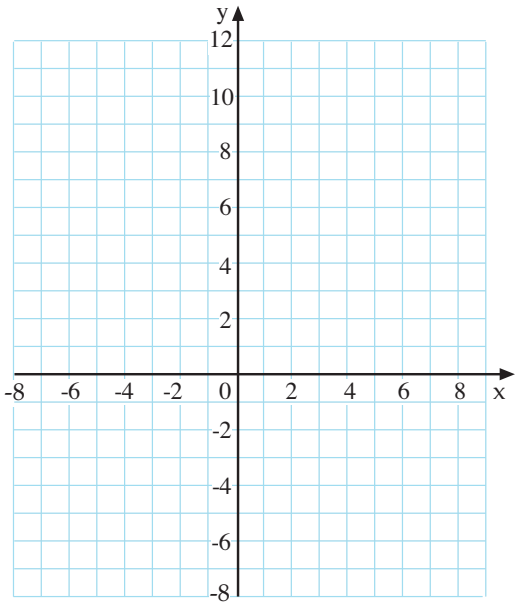


348.

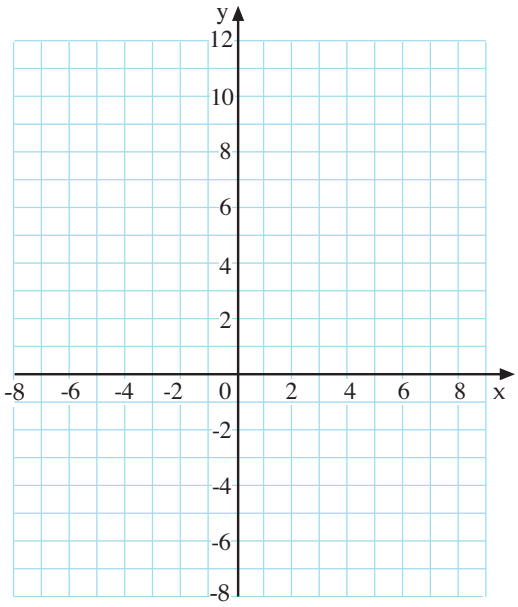


These exercises are from Page 155 of the Year 11 Mathematics Course Book and the answers are on Page 365 & 366.

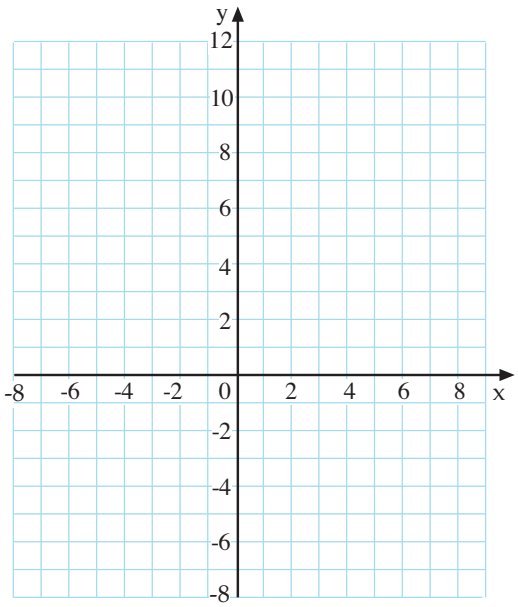
349.



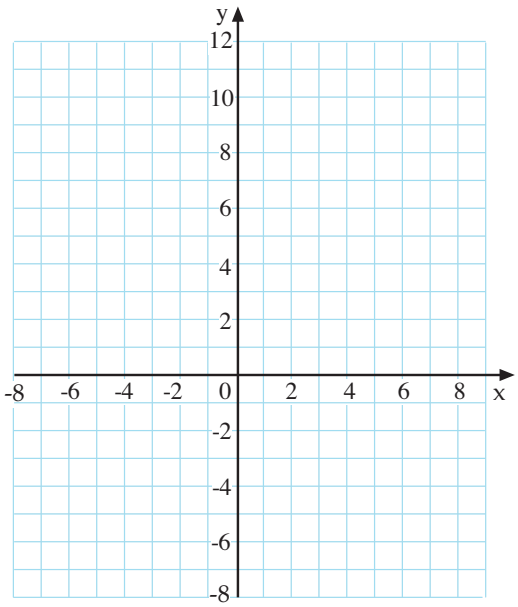
350.



351.

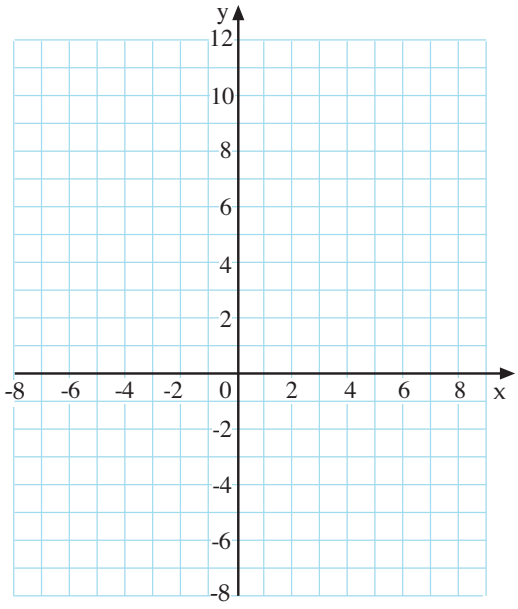


352.

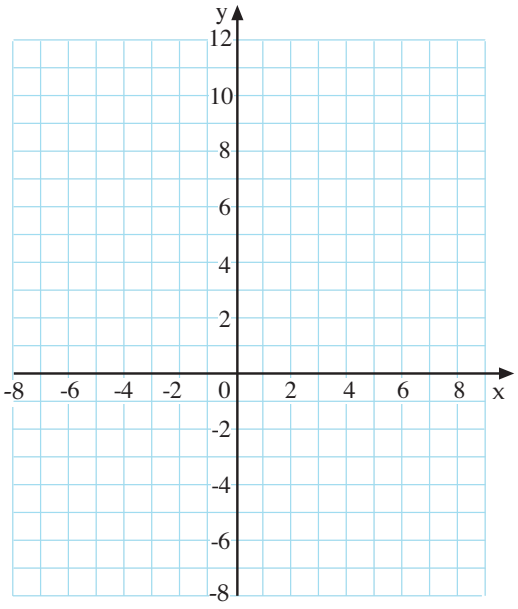


These exercises are from Page 155 of the Year 11 Mathematics Course Book and the answers are on Page 366.

353.



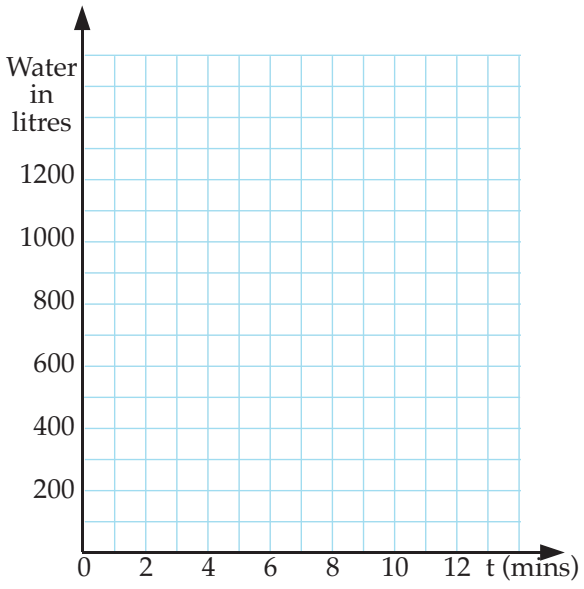
354.



These exercises are from Page 155 of the Year 11 Mathematics Course Book and the answers are on Page 366.

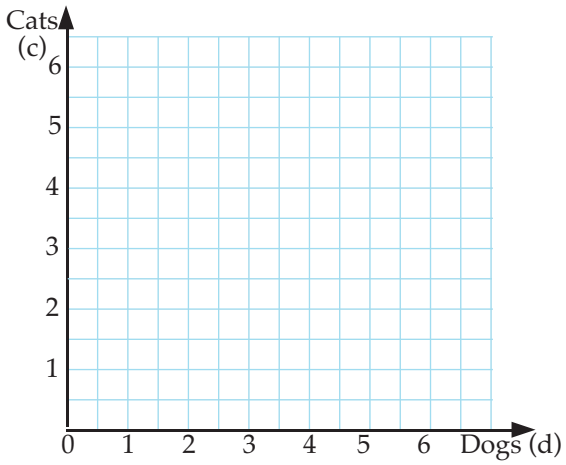
From the Year 11 Mathematics Course Book, form two equations for each problem, then graph them on the set of axes, to find the solution.

355.

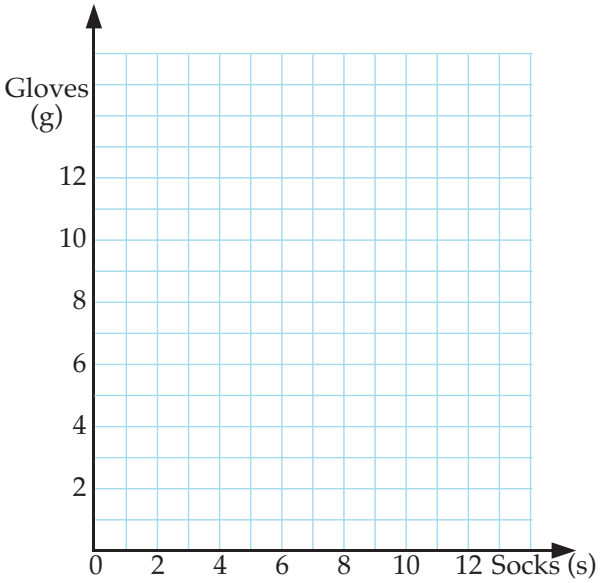


These exercises are from Page 156 of the Year 11 Mathematics Course Book and the answers are on Page 366.

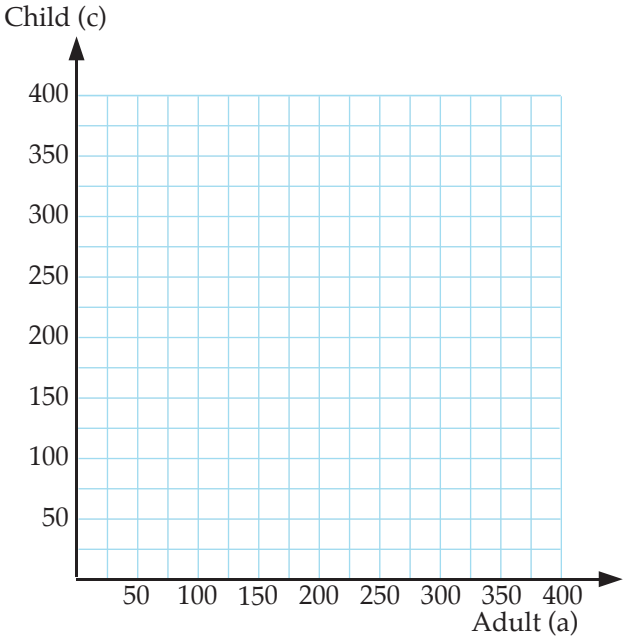
356.



357.

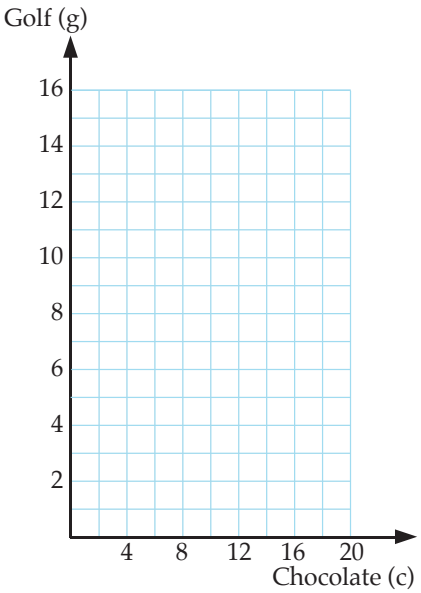


358.



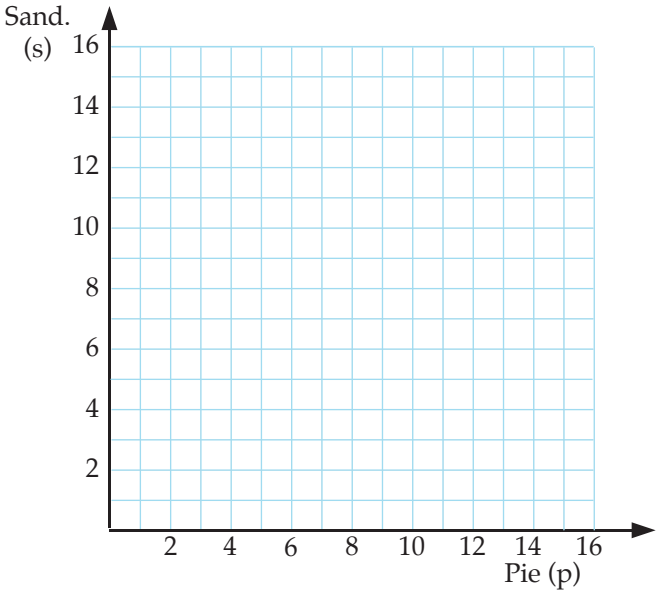
These exercises are from Page 156 of the Year 11 Mathematics Course Book and the answers are on Page 366.

359.



These exercises are from Page 157 of the Year 11 Mathematics Course Book and the answers are on Page 366.

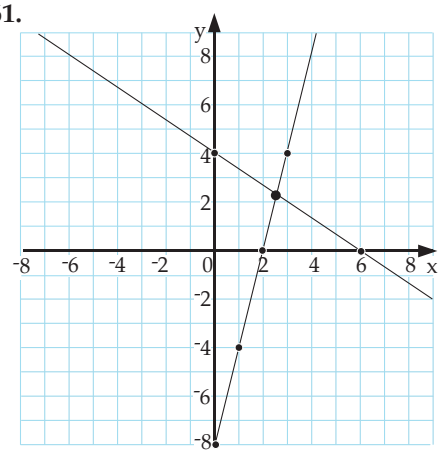
360.



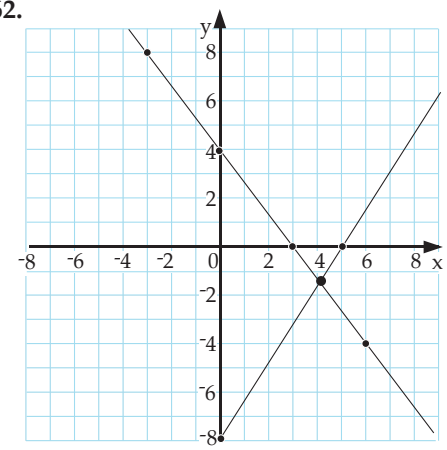
These exercises are from Page 158 of the Year 11 Mathematics Course Book and the answers are on Page 366 & 367.

From the Year 11 Mathematics Course Book, identify a pair of simultaneous linear equations and hence find the rational solution for the point or points of intersection.

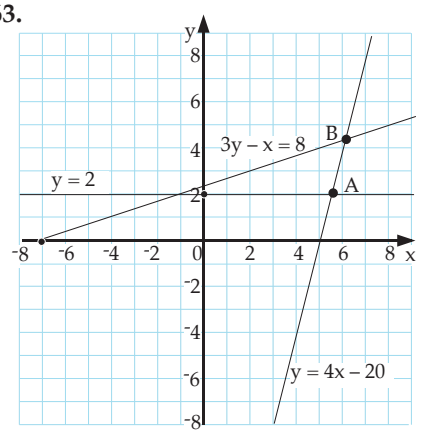
361.



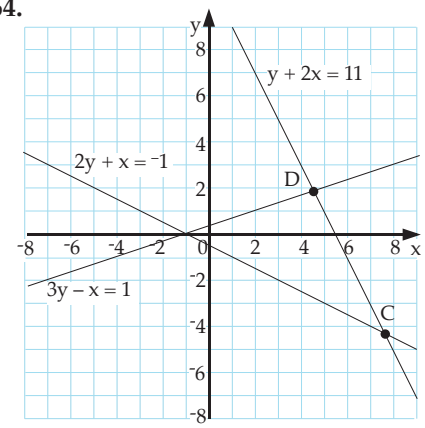
362.



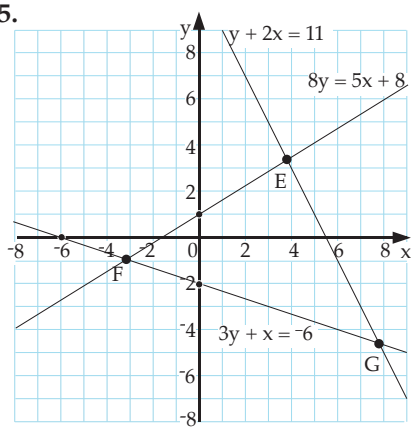
363.



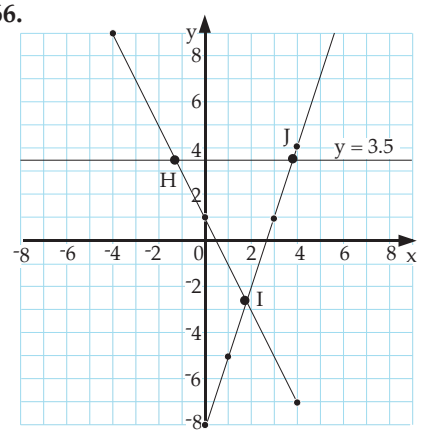
364.



365.

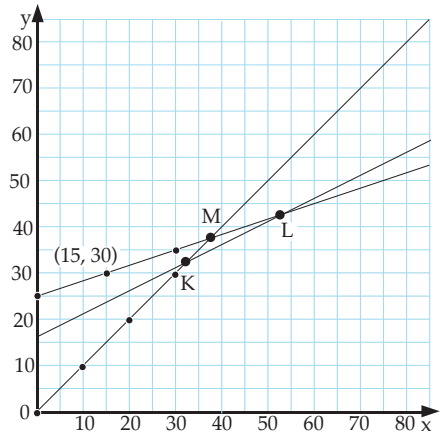


366.

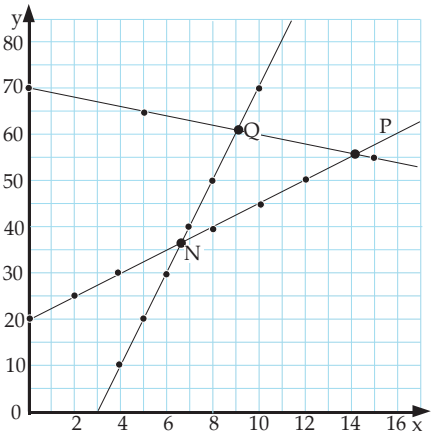


These exercises are from Page 159 of the Year 11 Mathematics Course Book and the answers are on Page 367.

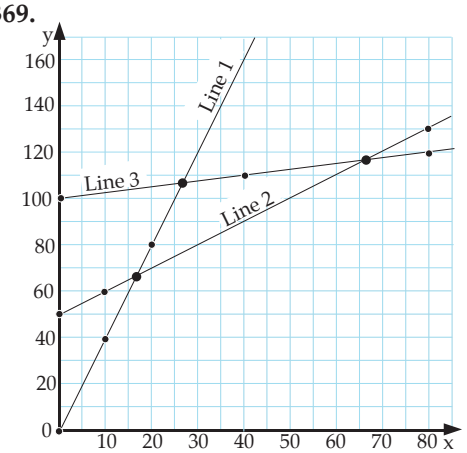
367.



368.



369.



These exercises are from Page 162 of the Year 11 Mathematics Course Book and the answers are on Page 367.

From the Year 11 Mathematics Course Book, solve the simultaneous equations using the Elimination Method. An answer alone is not sufficient, supporting applicable algebraic working is required.

370.

371.

These exercises are from Page 162 of the Year 11 Mathematics Course Book and the answers are on Page 367.

372.

373.

374.

375.

376.

377.

These exercises are from Page 162 of the Year 11 Mathematics Course Book and the answers are on Page 367.

378.

379.

380.

381.

382.

383.

These exercises are from Page 162 of the Year 11 Mathematics Course Book and the answers are on Page 367.

384.

385.

386.

387.

388.

389.

These exercises are from Page 164 of the Year 11 Mathematics Course Book and the answers are on Page 367.

From the Year 11 Mathematics Course Book, solve the simultaneous equations using the Substitution Method. An answer alone is not sufficient, supporting applicable algebraic working is required.

390.

391.

392.

393.

394.

395.

These exercises are from Page 164 of the Year 11 Mathematics Course Book and the answers are on Page 367.

396.

397.

398.

399.

400.

401.

These exercises are from Page 164 of the Year 11 Mathematics Course Book and the answers are on Page 367.

402.

403.

404.

405.

406.

407.

These exercises are from Page 165 of the Year 11 Mathematics Course Book and the answers are on Page 367.

From the Year 11 Mathematics Course Book, solve the simultaneous equations by first formulating an equation for each statement. An answer alone is not sufficient, supporting applicable algebraic working is required.

408.

409.

410.

411.

These exercises are from Page 166 of the Year 11 Mathematics Course Book and the answers are on Page 367.

412.

These exercises are from Page 166 of the Year 11 Mathematics Course Book and the answers are on Page 367.

413.

414.

415.

416. a) and b)

417. a) and b)

418. a), b) and c)

These exercises are from Page 166 of the Year 11 Mathematics Course Book and the answers are on Page 367.

419. a) and b)

420. a) and b)

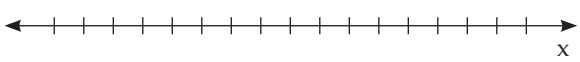
421.

422. a) and b)

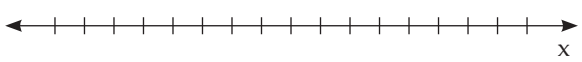
These exercises are from Page 168 of the Year 11 Mathematics Course Book and the answers are on Page 367.

From the Year 11 Mathematics Course Book, solve the linear inequations and graph the solution on a number line.

423.

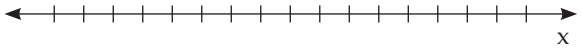


424.

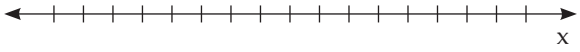


These exercises are from Page 168 of the Year 11 Mathematics Course Book and the answers are on Page 367.

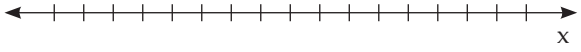
425.



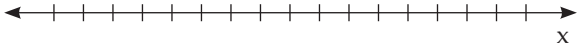
426.



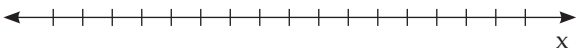
427.



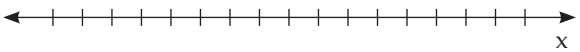
428.



429.

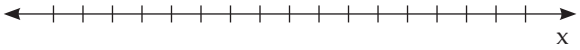


430.



These exercises are from Page 168 of the Year 11 Mathematics Course Book and the answers are on Page 367.

431.



These exercises are from Page 168 of the Year 11 Mathematics Course Book and the answers are on Page 368.

From the Year 11 Mathematics Course Book, solve the linear inequations. Applicable working is required.

432.

433.

434.

435.

These exercises are from Page 168 of the Year 11 Mathematics Course Book and the answers are on Page 368.

436.

437.

438.

439.

440.

441.

442.

443.

These exercises are from Page 168 of the Year 11 Mathematics Course Book and the answers are on Page 368.

444.

445.

446.

These exercises are from Page 171 of the Year 11 Mathematics Course Book and the answers are on Page 368.

From the Year 11 Mathematics Course Book, complete the difference table for each of the sequences. If they are linear find the rule that generates the sequence in the form t = dn ± a constant.

447.

Sequence	First order differences

448.

Sequence	First order differences

449.

Sequence	First order differences

450.

Sequence	First order differences

These exercises are from Page 171 of the Year 11 Mathematics Course Book and the answers are on Page 368.

451.

Sequence	First order differences

452.

Sequence	First order differences

453.

Sequence	First order differences

454.

Sequence	First order differences

These exercises are from Page 172 of the Year 11 Mathematics Course Book and the answers are on Page 368.

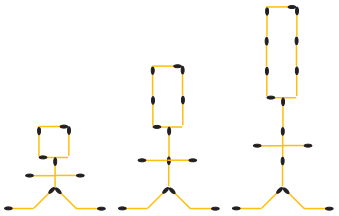
From the Year 11 Mathematics Course Book, answer the questions.

455. a), b), c), d) and e)

No. of trees	Area (m^2)	First order differences
1	20	
2	32	
3	44	
4	56	
5	68	
6	80	
7	92	

These exercises are from Page 172 & 173 of the Year 11 Mathematics Course Book and the answers are on Page 368.

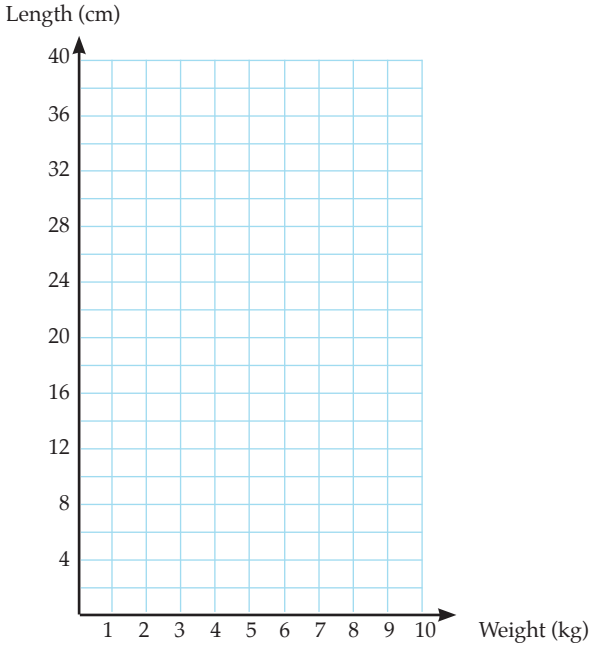
456. a), b), c), d) and e)



Head height (h)	Total matches (m)	First order differences
1	11	
2	14	
3		
4		
5		
6		

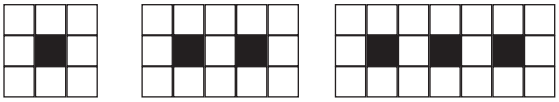
457. a), b), c), d), e), f), g), h) i), ii) and iii) and i)

Weight (kg)	Lgth. (cm)	First order differences
1	11	
2	14	
3	17	
4	20	
5	23	
6	26	
7	29	

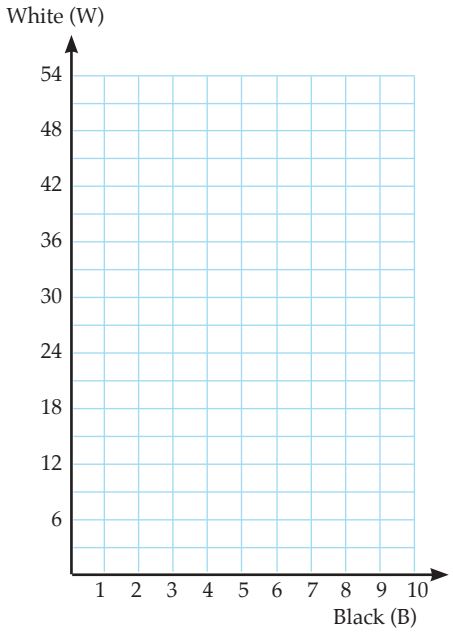


These exercises are from Page 173 of the Year 11 Mathematics Course Book and the answers are on Page 368.

458. a), b), c), d), e), f), g), h) i), ii) and iii) and i)

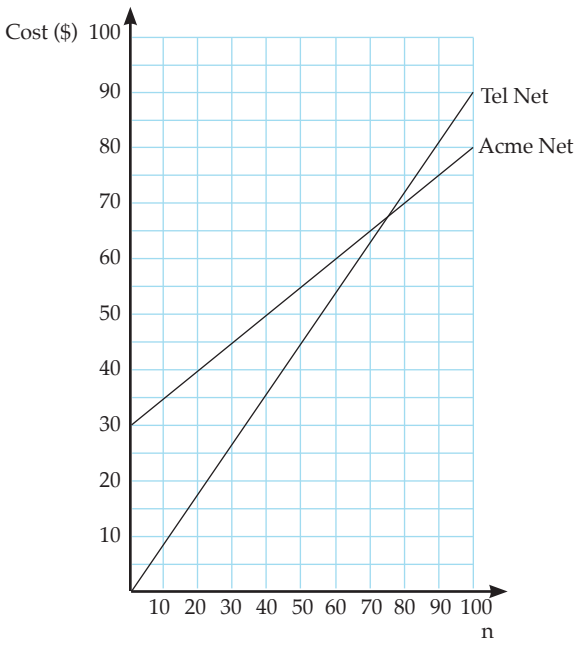


Black tiles (B)	White tiles (W)	First order differences
1	8	
2		
3		
4		
5		
6		



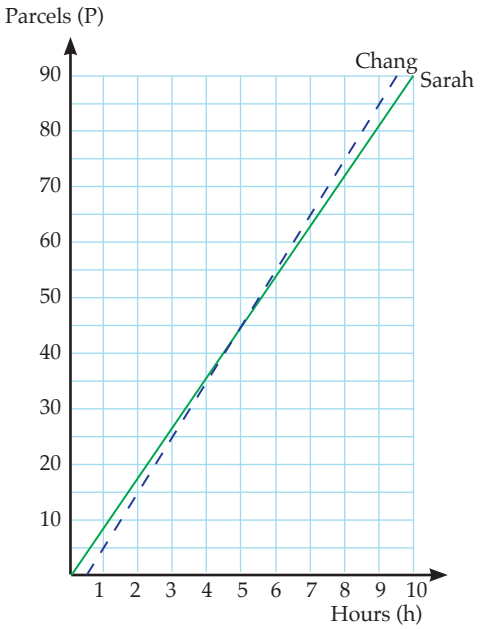
These exercises are from Page 174 of the Year 11 Mathematics Course Book and the answers are on Page 368.

459. a), b), c), d), e), f), g) and h)



These exercises are from Page 174 of the Year 11 Mathematics Course Book and the answers are on Page 369.

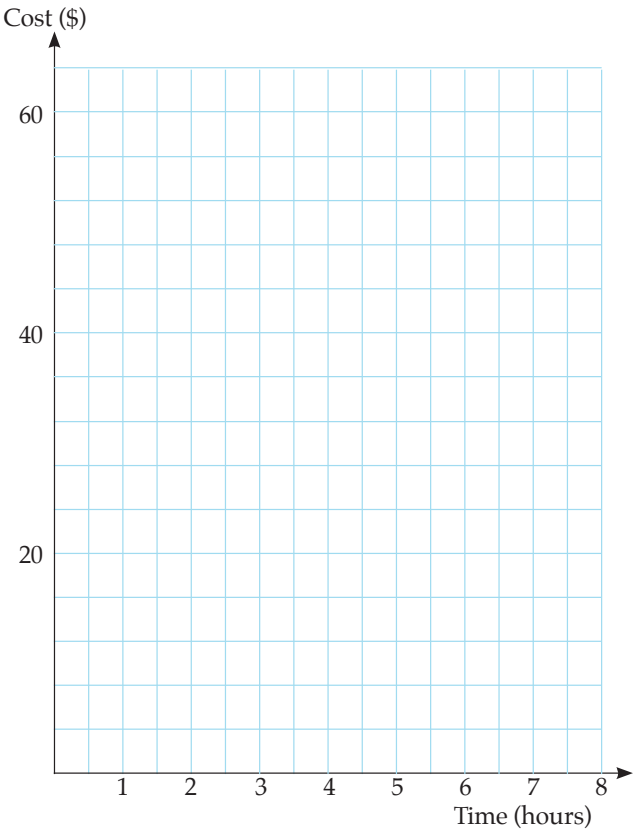
460. a), b), c), d), e), f), g), h) , i) and j)



These exercises are from Page 175 of the Year 11 Mathematics Course Book and the answers are on Page 369.

461. a), b), c), d) and e) i) and ii)

Time (hours)	Cost ($)
≤ 1 hour	20
1 < hours ≤ 2	24
2 < hours ≤ 3	28
3 < hours ≤ 4	32
4 < hours ≤ 5	36
5 < hours ≤ 6	40
6 < hours ≤ 7	44
7 < hours ≤ 8	48



These exercises are from Page 177 of the Year 11 Mathematics Course Book and the answers are on Page 369.

From the Year 11 Mathematics Course Book, expand and simplify. Applicable working is required.

462.

463.

464.

465.

466.

467.

468.

469.

470.

471.

472.

473.

474.

475.

476.

477.

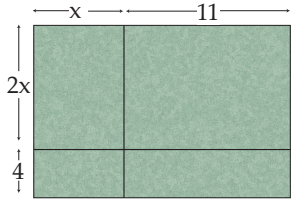
478.

479.

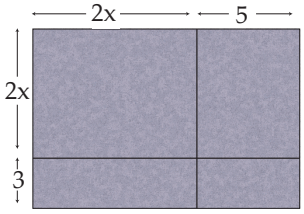
These exercises are from Page 178 of the Year 11 Mathematics Course Book and the answers are on Page 369.

From the Year 11 Mathematics Course Book, form an expression and use it to find an expanded expression for the area of each figure.

480. Find the shaded area in expanded form.

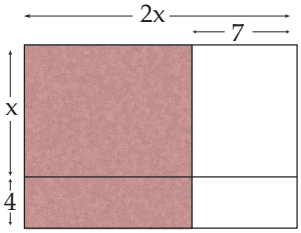


481. Find the shaded area in expanded form.

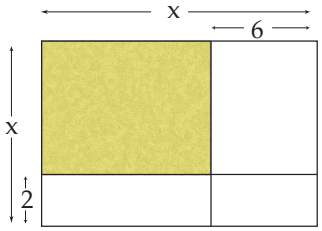


These exercises are from Page 178 of the Year 11 Mathematics Course Book and the answers are on Page 369.

482. Find the shaded area in expanded form.

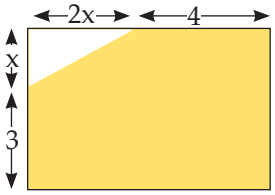


483. Find the shaded area in expanded form.



484.

485. Give an expression for the shaded area.



These exercises are from Page 180 of the Year 11 Mathematics Course Book and the answers are on Page 369.

From the Year 11 Mathematics Course Book, identify whether each of the relations represented in tabular form are quadratic, by studying the differences between successive y terms.

486.

x	y	First order differences	Second order differences
−3	22		
−2	13		
−1	6		
0	1		
1	−2		
2	−3		
3	−2		

487.

x	y	First order differences	Second order differences
0	0		
1	−1		
2	0		
3	3		
4	8		
5	15		
6	24		

These exercises are from Page 180 of the Year 11 Mathematics Course Book and the answers are on Page 369 & 370.

488.

x	y	First order differences	Second order differences
$^{-}1$	4		
0	3		
1	6		
2	13		
3	24		
4	39		
5	58		

489.

x	y	First order differences	Second order differences
$^{-}3$	$^{-}34$		
$^{-}2$	$^{-}15$		
$^{-}1$	$^{-}4$		
0	$^{-}1$		
1	$^{-}6$		
2	$^{-}19$		
3	$^{-}40$		

490.

x	y	First order differences	Second order differences
$^{-}1$	14		
0	9		
1	4		
2	$^{-}1$		
3	$^{-}6$		
4	$^{-}11$		
5	$^{-}16$		

491.

x	y	First order differences	Second order differences
$^{-}3$	24		
$^{-}2$	10		
$^{-}1$	2		
0	0		
1	4		
2	14		
3	30		

492.

x	y	First order differences	Second order differences
0	$^{-}2$		
1	6		
2	16		
3	28		
4	42		
5	58		
6	76		

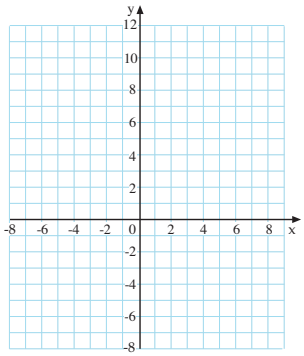
493.

x	y	First order differences	Second order differences
$^{-}3$	$^{-}63$		
$^{-}2$	$^{-}26$		
$^{-}1$	$^{-}7$		
0	0		
1	1		
2	2		
3	9		

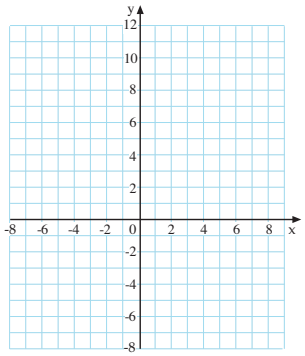
These exercises are from Page 181 of the Year 11 Mathematics Course Book and the answers are on Page 370.

From the Year 11 Mathematics Course Book, by plotting the sets of points on the axes, identify whether each set is quadratic or not.

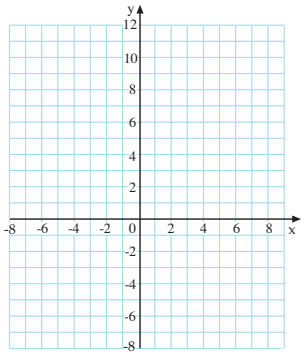
494. {(⁻4, 8), (⁻3, 3), (⁻2, 0), (⁻1, ⁻1), (0, 0), (1, 3), (2, 8)}



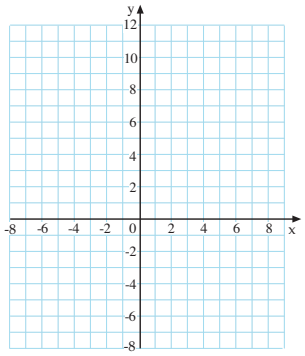
495. {(1, ⁻2), (2, ⁻3), (3, ⁻2), (4, 1), (0, 1)}



496. {(0, ⁻4), (2 , ⁻8), (⁻1, ⁻5), (⁻2, ⁻8), (1, ⁻5)}



497. {(1, 6), (2, 3), (3, 2), (6, 1)}



From the Year 11 Mathematics Course Book, by studying the equation identify whether each of the relations are quadratic or not.

498. $y = 3x - x^2$

499. $y = x^2 + 3x + 1$

500. $y^2 = 4 - x^2$

501. $y = (x - 2)^2$

502. $xy = 8$

503. $y = \frac{1}{2}x^2$

504. $y = 3x - 4$

505. $y = (x + 1)^2 - 2$

506. $y = (x + 4)(2x - 3)$

507. $\sqrt{y} = x$

These exercises are from Page 183 of the Year 11 Mathematics Course Book and the answers are on Page 370.

From the Year 11 Mathematics Course Book, factorise.

508.

509.

510.

511.

512.

513.

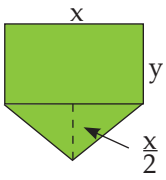
514.

515.

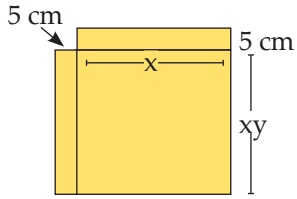
516.

517.

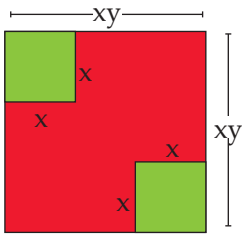
518.



519.



520.



From the Year 11 Mathematics Course Book, factorise the quadratics.

521.

522.

523.

524.

525.

526.

These exercises are from Page 184 of the Year 11 Mathematics Course Book and the answers are on Page 370.

527.

528.

529.

530.

531.

532.

533.

534.

535.

536.

537.

538.

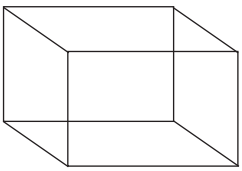
539.

540.

541.

542.

543.



544.

These exercises are from Page 185 of the Year 11 Mathematics Course Book and the answers are on Page 370 & 371.

From the Year 11 Mathematics Course Book, factorise.

545.

546.

547.

548.

549.

550.

551.

552.

553.

554.

555.

556.

557.

558.

559.

560.

These exercises are from Page 186 of the Year 11 Mathematics Course Book and the answers are on Page 371.

From the Year 11 Mathematics Course Book, factorise.

561.

562.

563.

564.

565.

566.

567.

568.

569.

570.

571.

572.

573.

574.

575.

576.

577.

578.

579.

580.

581.

582.

These exercises are from Page 187 of the Year 11 Mathematics Course Book and the answers are on Page 371.

From the Year 11 Mathematics Course Book, solve the quadratic equations. Where applicable your factorisation must be shown first.

583.

584.

585.

586.

587.

588.

589.

590.

591.

592.

593.

594.

595.

596.

597.

598.

599.

600.

601.

602.

603.

604.

605.

606.

These exercises are from Page 188 of the Year 11 Mathematics Course Book and the answers are on Page 371.

607.

608.

609.

610.

From the Year 11 Mathematics Course Book, solve the quadratic equations. Where applicable factorisation must be shown first.

611.

612.

613.

614.

615.

616.

617.

618.

619.

620.

621.

622.

623.

624.

625.

These exercises are from Page 188 of the Year 11 Mathematics Course Book and the answers are on Page 371 & 372.

From the Year 11 Mathematics Course Book, for each first form a quadratic equation and then solve.

626.

627.

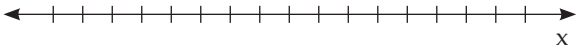
628.

629.

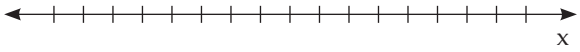
These exercises are from Page 190 of the Year 11 Mathematics Course Book and the answers are on Page 372.

From the Year 11 Mathematics Course Book, solve the quadratic inequations and mark the solution(s) on a number line.

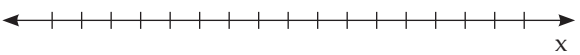
630.



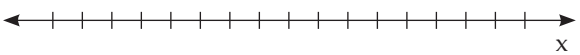
631.



632.

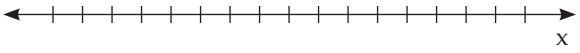


633.

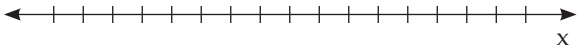


These exercises are from Page 190 of the Year 11 Mathematics Course Book and the answers are on Page 372.

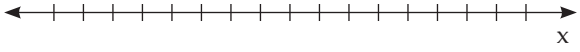
634.



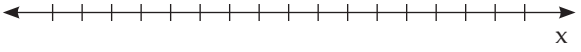
635.



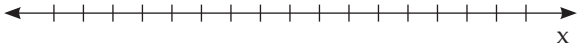
636.



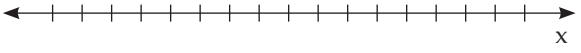
637.



638.



639.



From the Year 11 Mathematics Course Book, first form a quadratic inequation and then solve.

640.

641.

These exercises are from Page 190 of the Year 11 Mathematics Course Book and the answers are on Page 372.

642.

643.

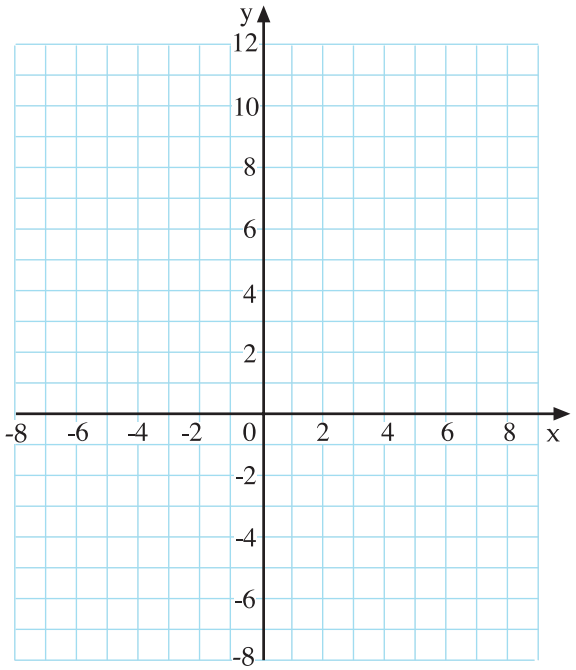
644.

These exercises are from Page 192 of the Year 11 Mathematics Course Book and the answers are on Page 372.

From the Year 11 Mathematics Course Book, graph the parabolas, by plotting points or using a graphics calculator to produce a table of values first. Put two graphs on each set of axes

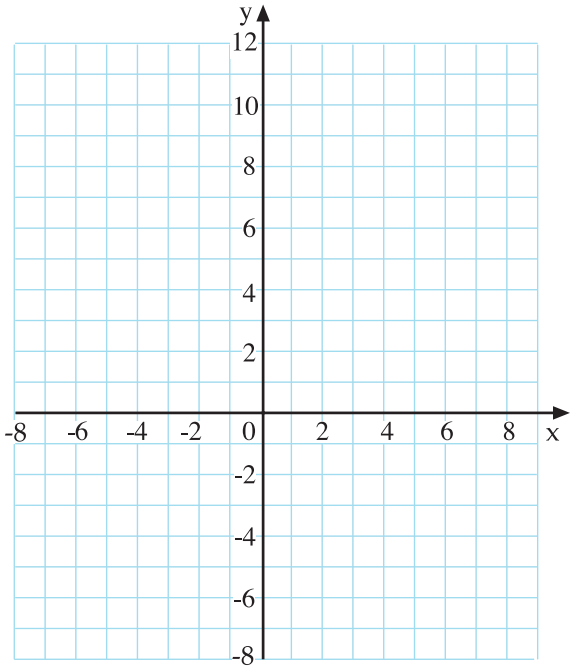
645. $y = x^2 - 6$

646. $y = 2x^2$



647. $y = (x + 1)^2$

648. $y = (x - 2)^2$



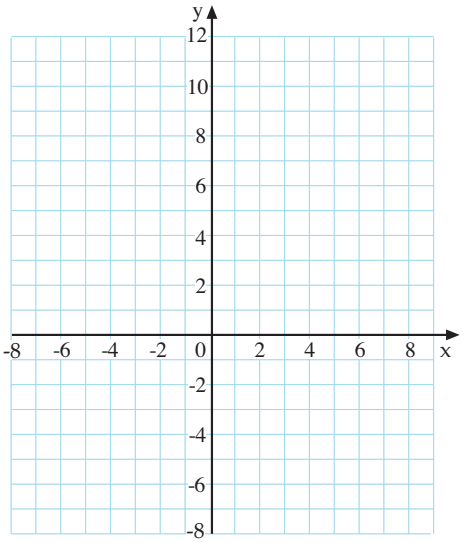
These exercises are from Page 192 of the Year 11 Mathematics Course Book and the answers are on Page 372.

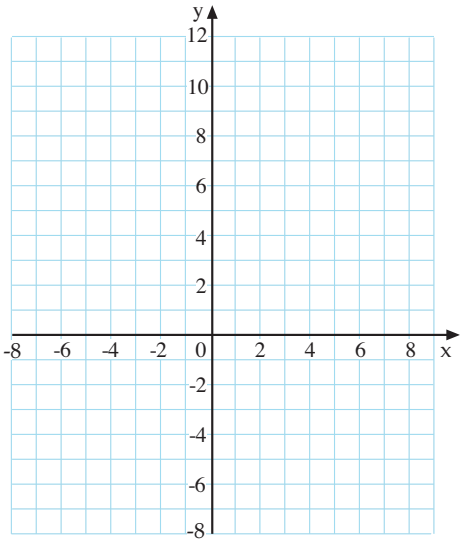
649. $y = 0.5x^2 + 1$

650. $y = (x - 1)^2 - 4$

651. $y = x^2 - 2x - 3$

652. $y = {}^{-}x^2 + 9$





These exercises are from Page 194 of the Year 11 Mathematics Course Book and the answers are on Page 372 & 373.

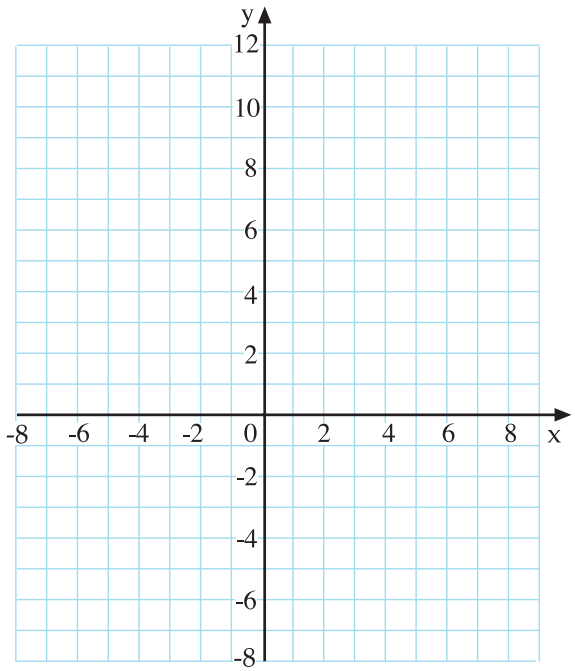
From the Year 11 Mathematics Course Book, graph the parabolas below, by finding the x and y intercepts and hence the base of the parabola and then sketch the graph. Put two graphs on each set of axes.

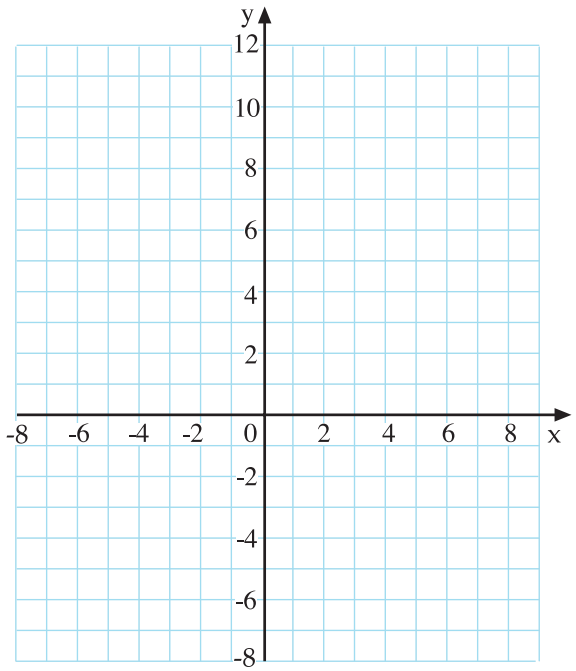
653. $y = (x + 1)(x - 1)$

654. $y = (x + 2)(x + 6)$

655. $y = x(x + 3)$

656. $y = (x + 2)(x - 2)$

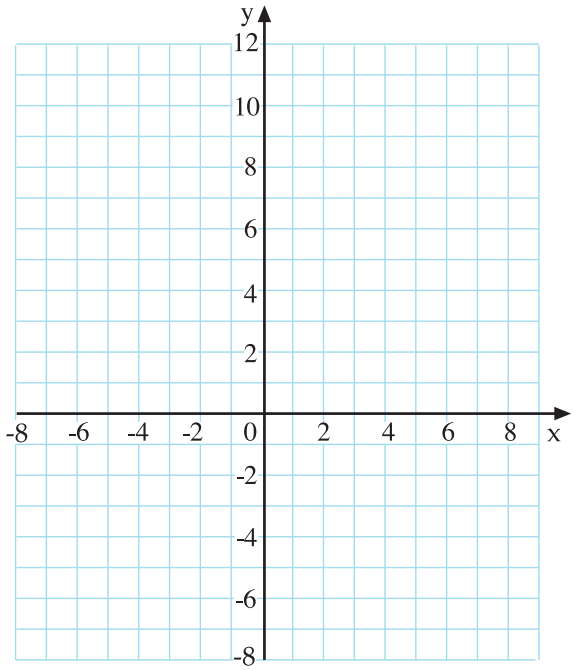




These exercises are from Page 194 of the Year 11 Mathematics Course Book and the answers are on Page 373.

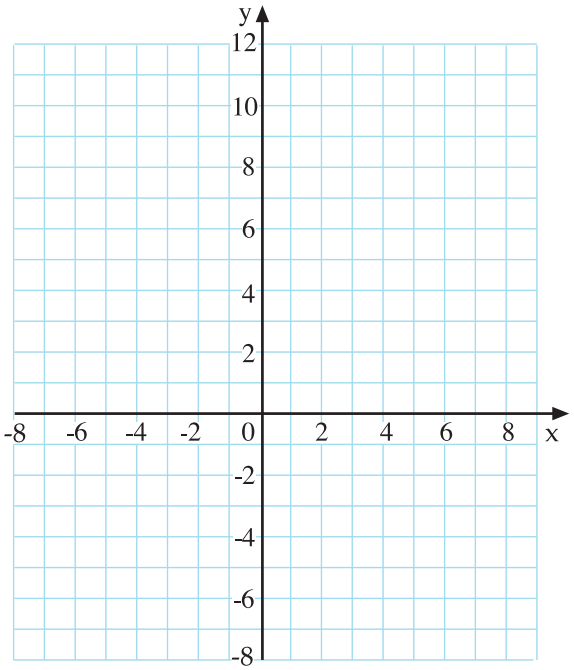
657. $y = (x + 2)(x - 4)$

658. $y = (x + 3)(x - 3)$



659. $y = (x + 3)^2$

660. $y = (x + 2)(x + 3)$

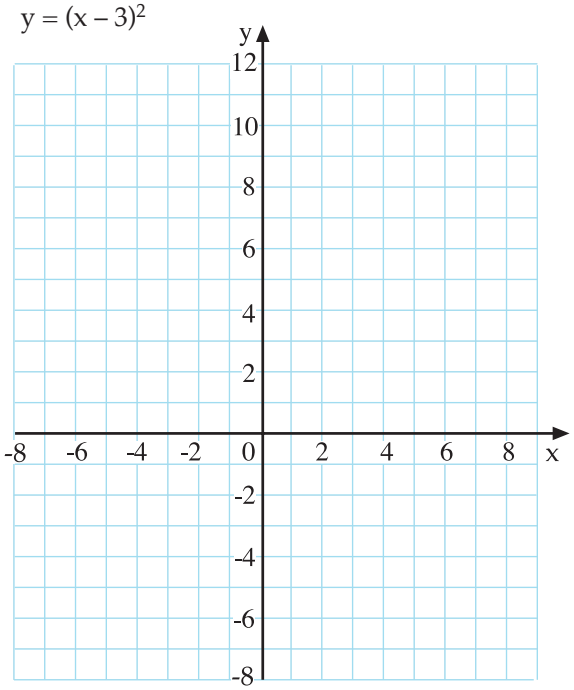


These exercises are from Page 196 of the Year 11 Mathematics Course Book and the answers are on Page 373.

From the Year 11 Mathematics Course Book, graph the parabolas, by transforming $y = x^2$. Put two graphs on each set of axes.

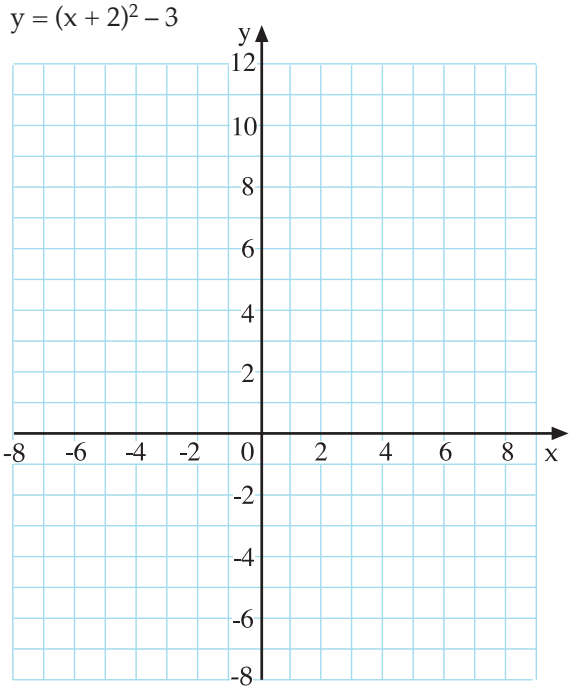
661. $y = x^2 - 3$

662. $y = (x - 3)^2$



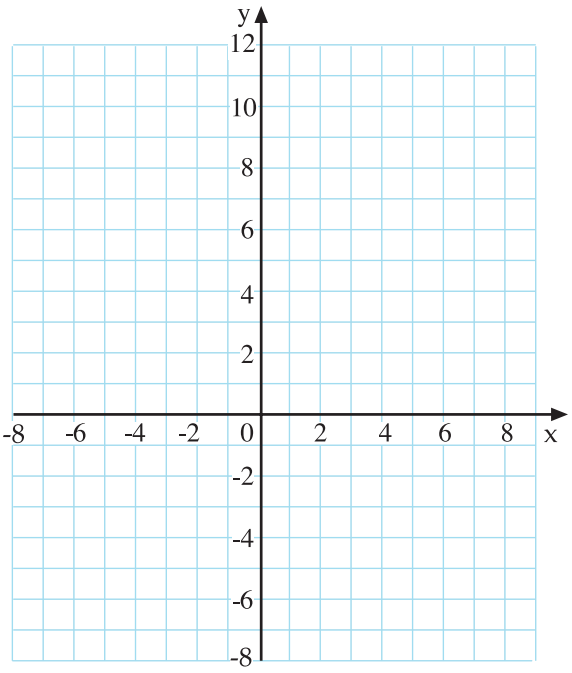
663. $y = (x + 4)^2$

664. $y = (x + 2)^2 - 3$

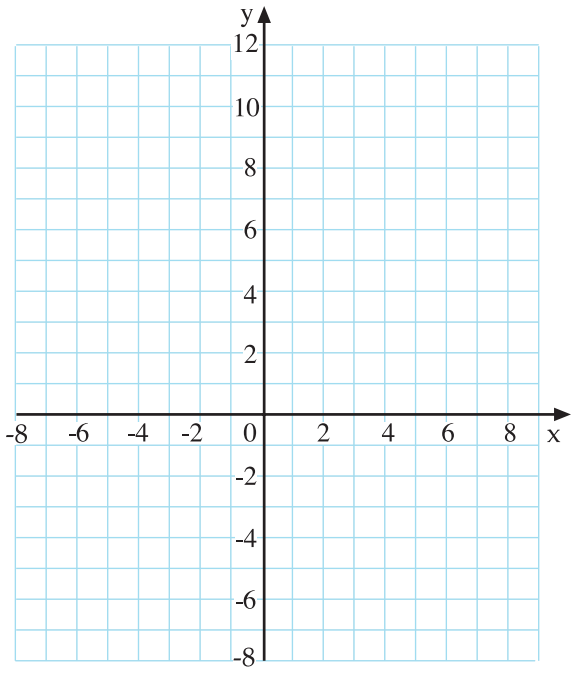


These exercises are from Page 196 of the Year 11 Mathematics Course Book and the answers are on Page 373.

665. $y = (x + 1)^2 - 2$



666. $y = (x - 2)^2 + 4$

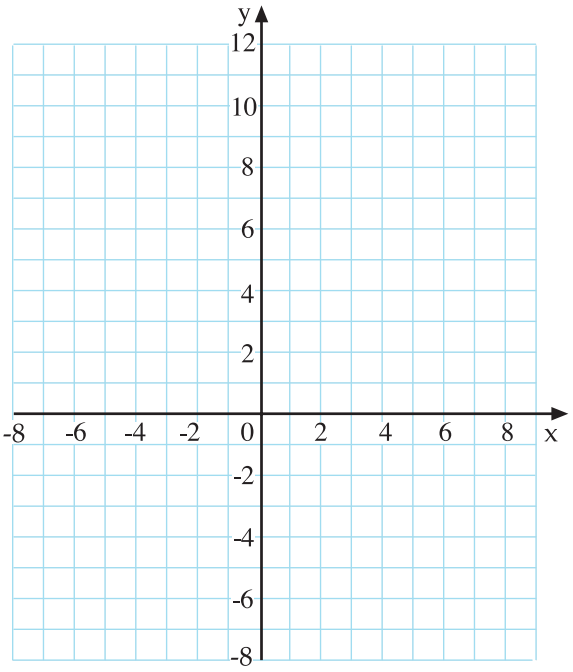


These exercises are from Page 198 of the Year 11 Mathematics Course Book and the answers are on Page 373 & 374.

From the Year 11 Mathematics Course Book, graph the parabolas, giving the coordinates of the base and any intercepts. Put two graphs on each set of axes.

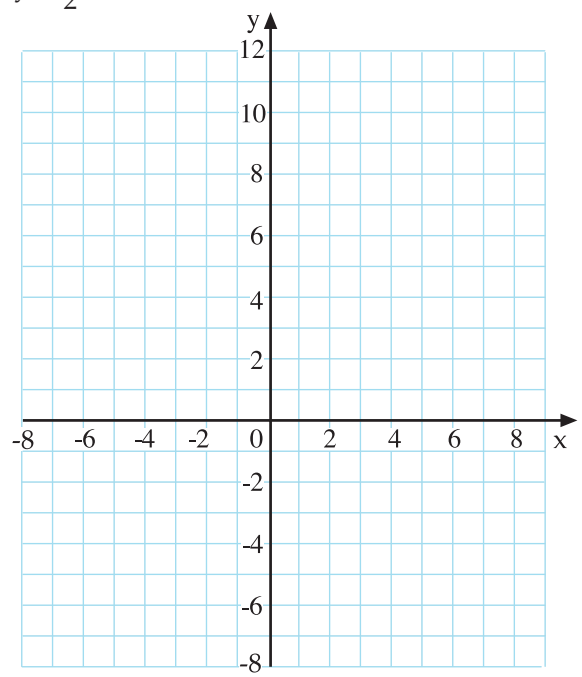
667. $y = {}^{-}x^2 + 4$

668. $y = {}^{-}(x + 1)^2$



669. $y = 2(x - 3)^2$

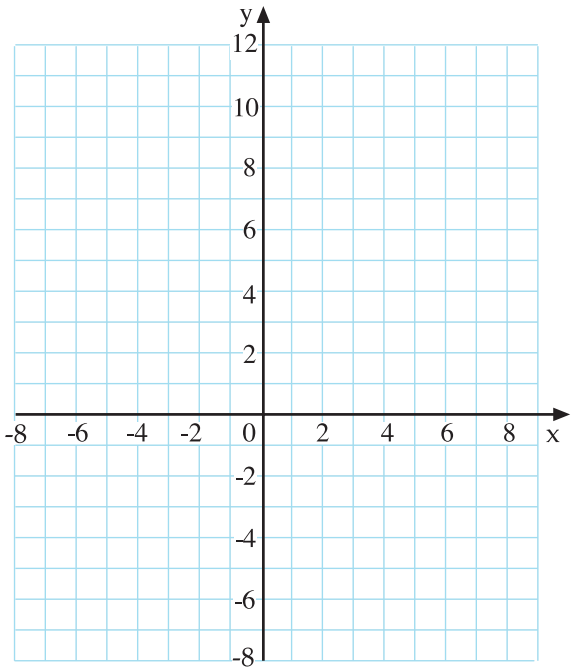
670. $y = \frac{1}{2}x^2 - 2$



These exercises are from Page 198 of the Year 11 Mathematics Course Book and the answers are on Page 374.

671. $y = 3x^2 + 4$

672. $y = {}^{-}2(x + 1)^2 + 8$



These exercises are from Page 200 of the Year 11 Mathematics Course Book and the answers are on Page 374.

From the Year 11 Mathematics Course Book, answer the questions. You must justify your answer with applicable working or reasoning.

673. a) and b)

674. a) and b)

675.

676.

These exercises are from Page 200 of the Year 11 Mathematics Course Book and the answers are on Page 374.

677.

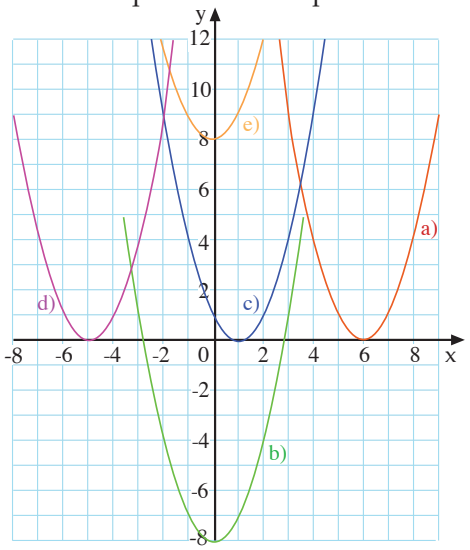
678.

679. a) and b)

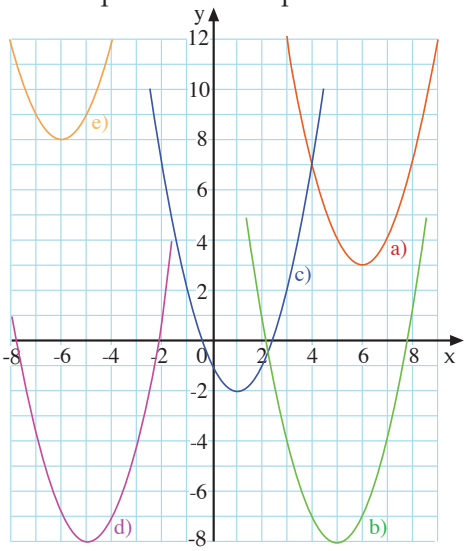
These exercises are from Page 203 of the Year 11 Mathematics Course Book and the answers are on Page 374.

From the Year 11 Mathematics Course Book, write the equation of each parabola in the required form.

680. Write the equation of each parabola.

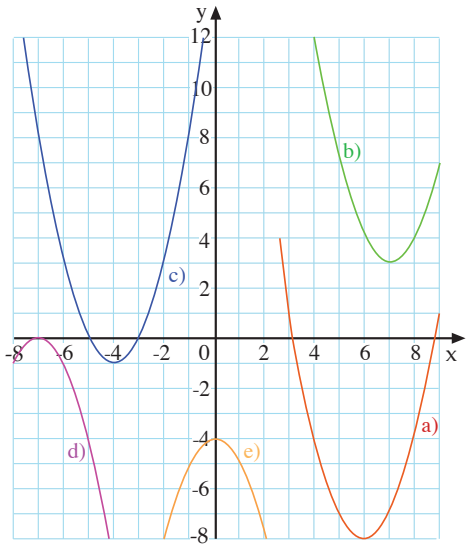


681. Write the equation of each parabola.

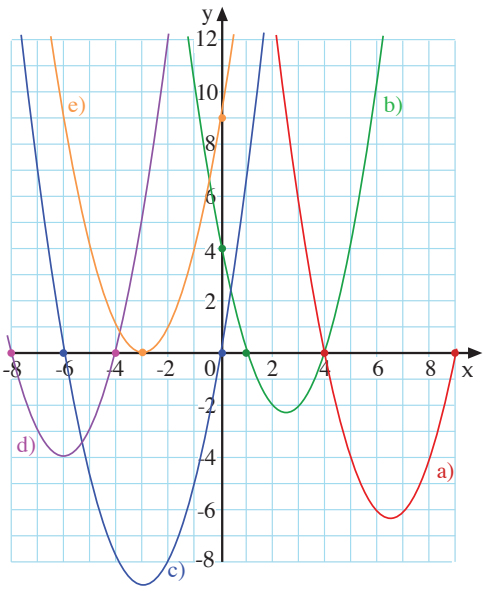


These exercises are from Page 203 of the Year 11 Mathematics Course Book and the answers are on Page 374.

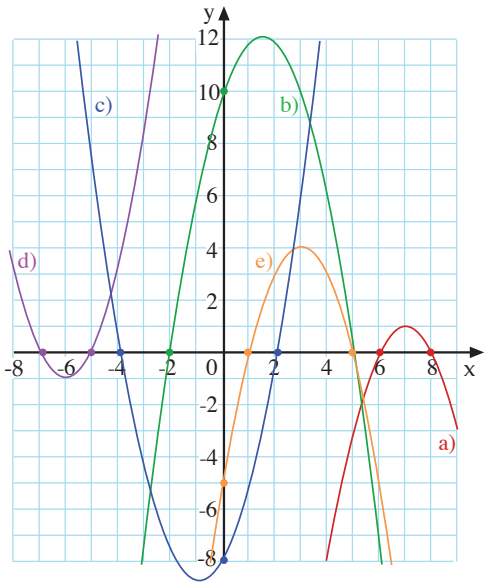
682.



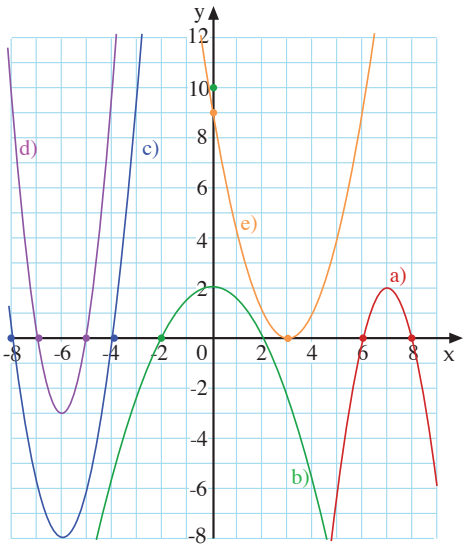
683.



684.



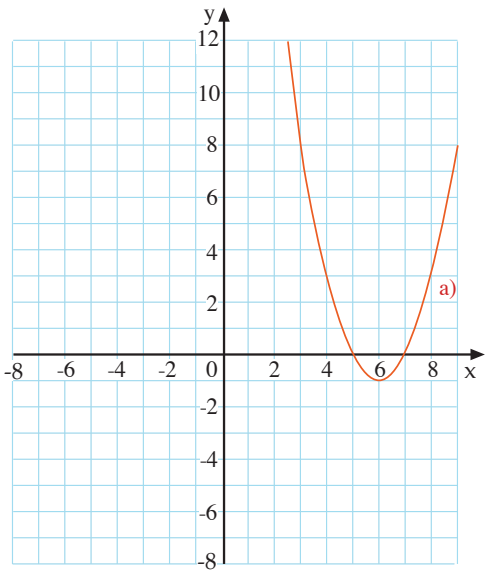
685.



These exercises are from Page 204 of the Year 11 Mathematics Course Book and the answers are on Page 375.

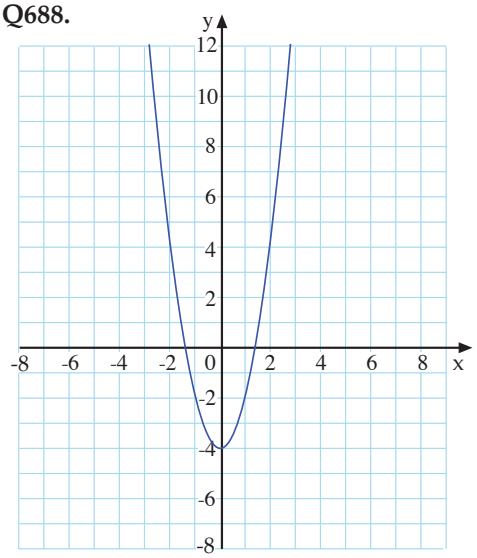
From the Year 11 Mathematics Course Book, transform the parabola and then derive the equation of the transformed parabola.

686. a), b), c), d) and e)



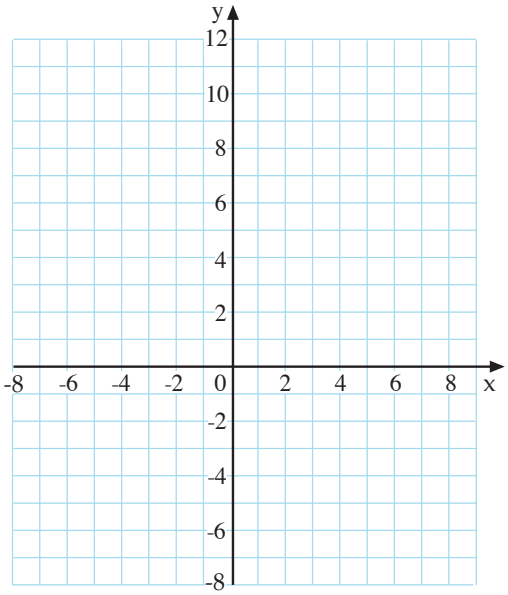
The parabola below has equation $y = 2x^2 - 4$. Complete the transformation of $y = 2x^2 - 4$ and derive the equation of the transformed parabola for **Q687.** and **Q688.**

687. a) and b) **688.** a) and b)



Derive the equation of each transformed parabola.

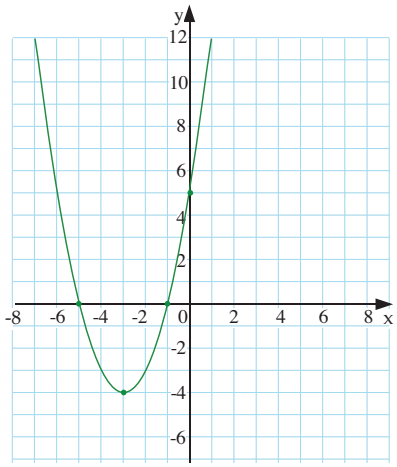
689. 690. 691. 692.



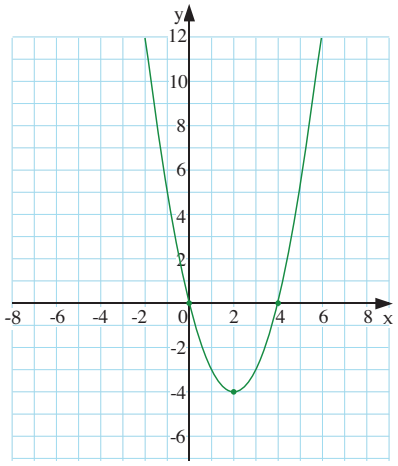
These exercises are from Page 205 of the Year 11 Mathematics Course Book and the answers are on Page 375.

From the Year 11 Mathematics Course Book, for each parabola identify the correct equation from the list given. There may be more than one correct answer.

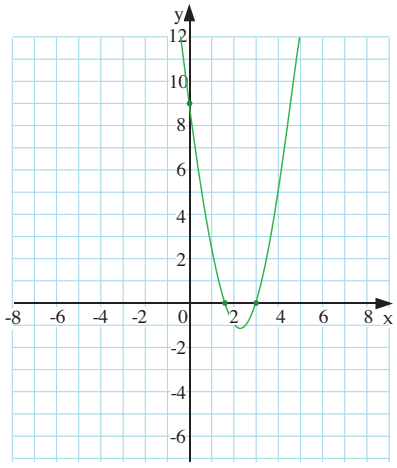
693.



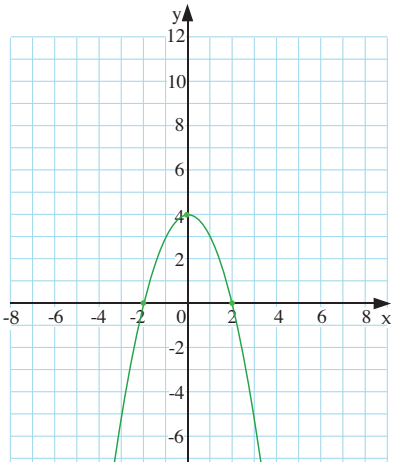
694.



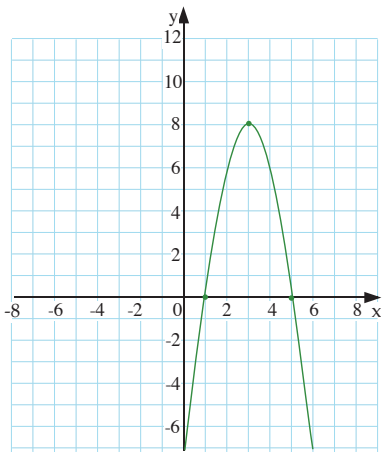
695.



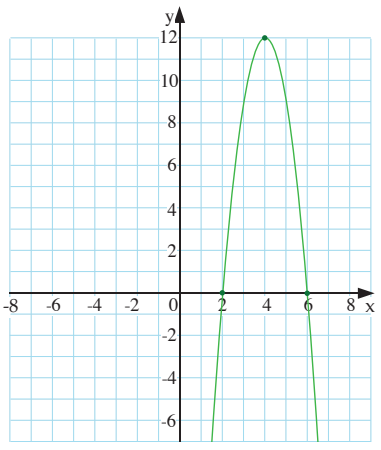
696.



697.



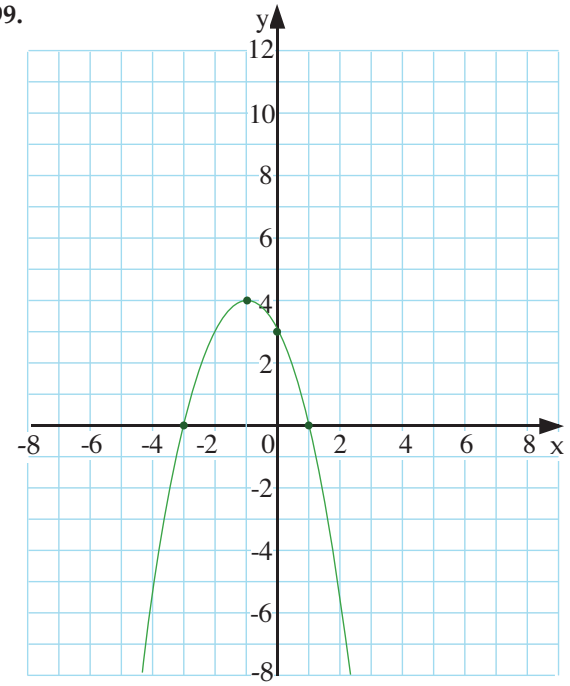
698.



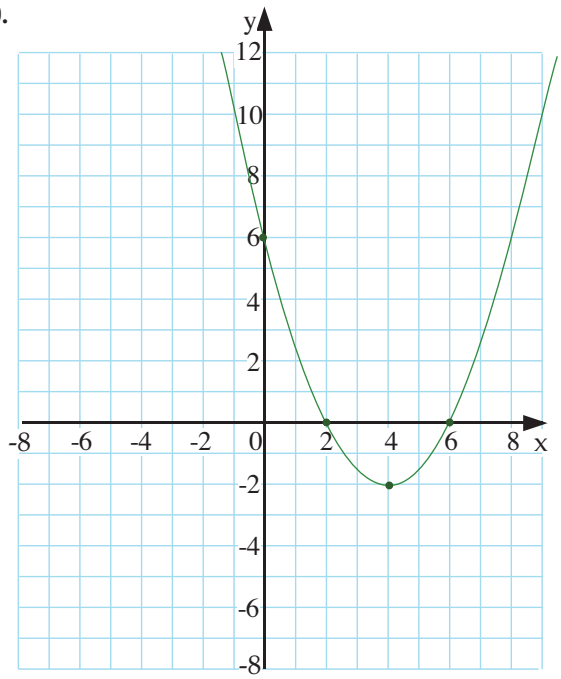
These exercises are from Page 206 of the Year 11 Mathematics Course Book and the answers are on Page 375.

From the Year 11 Mathematics Course Book, find the equation of each parabola in the form $y = k(x - a)(x - b)$.

699.

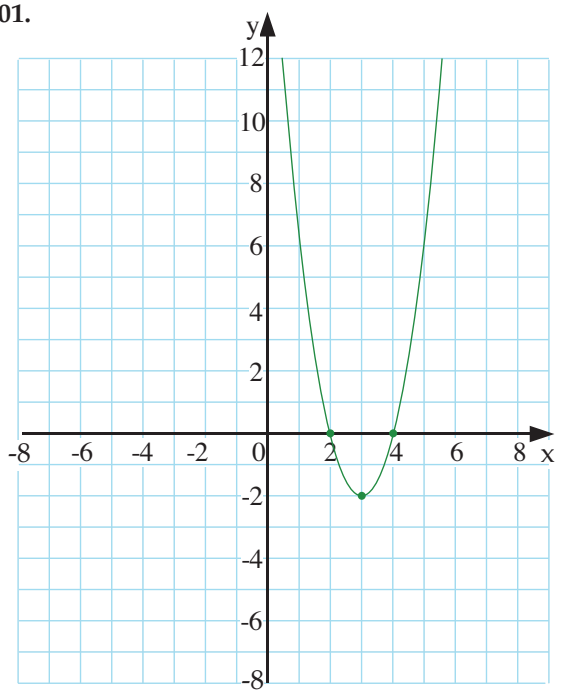


700.

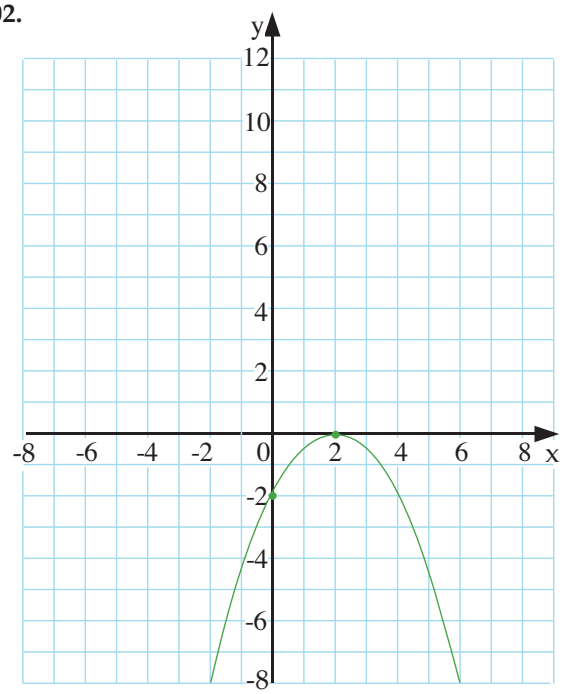


From the Year 11 Mathematics Course Book, find the equation of each parabola in the form $y = k(x + c)^2 + d$.

701.



702.



These exercises are from Page 209 of the Year 11 Mathematics Course Book and the answers are on Page 375.

From the Year 11 Mathematics Course Book, complete the difference table for each of the sequences. If they are quadratic find the rule that generates the sequence and the 10^{th} term.

703.

Term	Sequence	First order differences	Second order diffs. (k)	$kn^2/2$	Linear
1					
2					
3					
4					
5					
6					
7					

704.

Term	Sequence	First order differences	Second order diffs. (k)	$kn^2/2$	Linear
1					
2					
3					
4					
5					
6					
7					

705.

Term	Sequence	First order differences	Second order diffs. (k)	$kn^2/2$	Linear
1					
2					
3					
4					
5					
6					
7					

706.

Term	Sequence	First order differences	Second order diffs. (k)	$kn^2/2$	Linear
1					
2					
3					
4					
5					
6					
7					

707. $^{-}11, ^{-}22, ^{-}37, ^{-}56, ^{-}79, ^{-}106, ^{-}137$

Term	Sequence	First order differences	Second order diffs. (k)	$kn^2/2$	Linear
1					
2					
3					
4					
5					
6					
7					

708. 16, 2, $^{-}2$, 4, 20, 46, 82

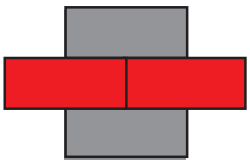
Term	Sequence	First order differences	Second order diffs. (k)	$kn^2/2$	Linear
1					
2					
3					
4					
5					
6					
7					

These exercises are from Page 210 & 211 of the Year 11 Mathematics Course Book and the answers are on Page 376.

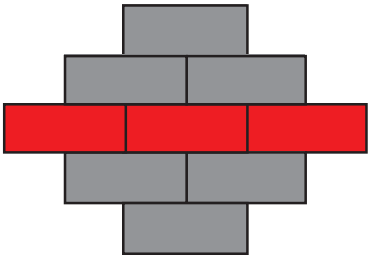
From the Year 11 Mathematics Course Book, solve the problems by investigating potential quadratic sequences.

709. a), b), c), d) and e)

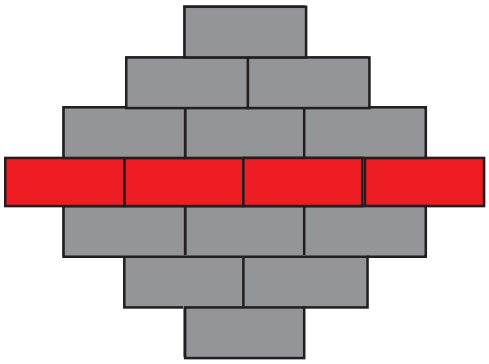
Design 1

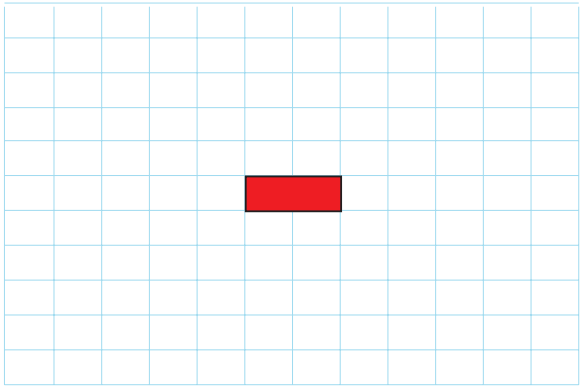


Design 2



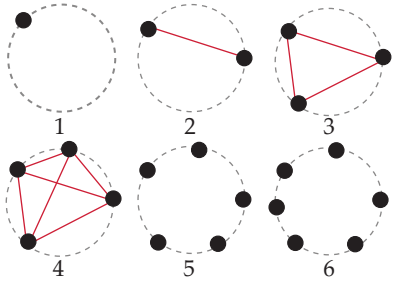
Design 3



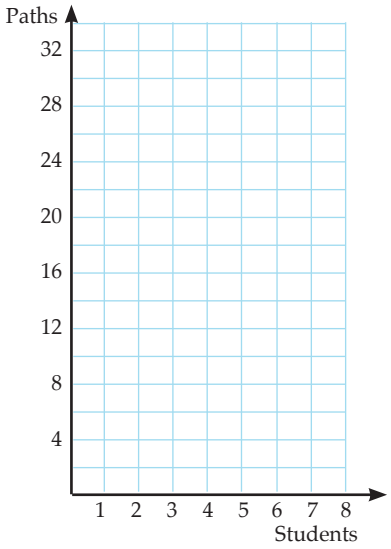


Design	Red Bricks	Grey Bricks	Total Bricks	First order diffs.	Second order diffs. (k)	$kn^2/2$	Linear
1	2	2	4				
2	3	6	9				
3	4						
4							
5							
6							
7							

710. a), b), c), d), e), f) and g)



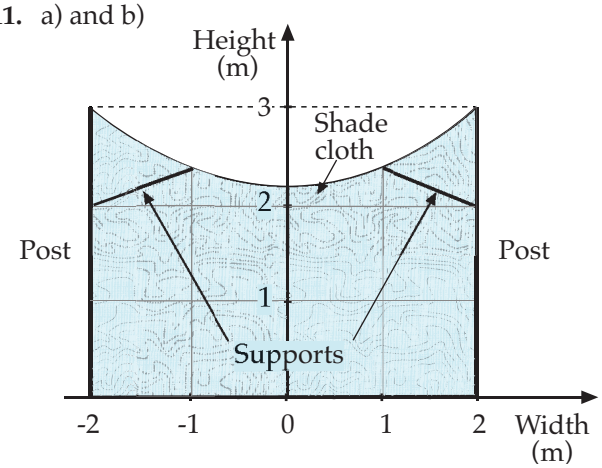
Students	Paths	First order differences	Second order diffs. (k)	$kn^2/2$	Linear
1					
2					
3					
4					
5					
6					
7					
8					



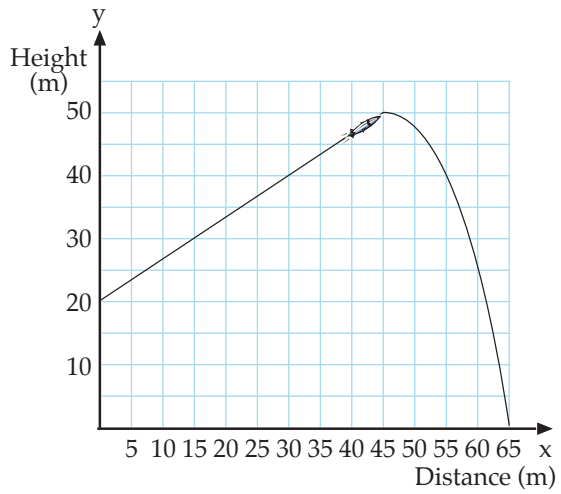
These exercises are from Page 211 of the Year 11 Mathematics Course Book and the answers are on Page 376.

710. cont...

711. a) and b)

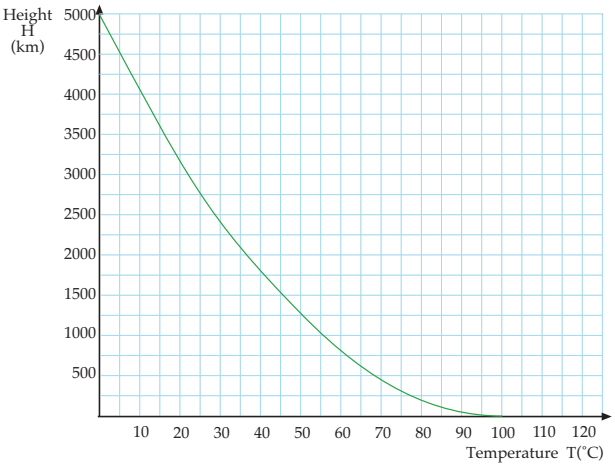


712. a), b) and c)

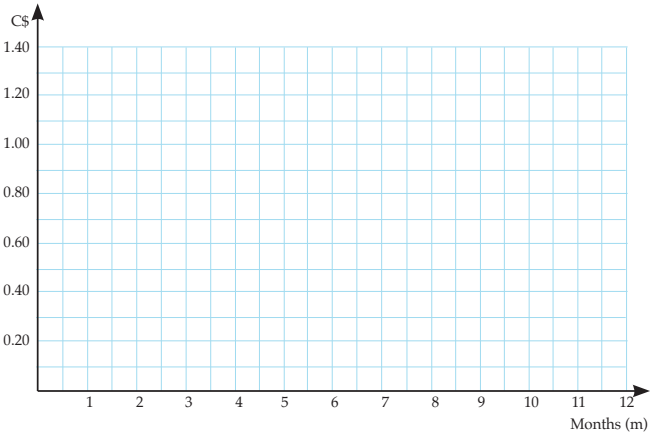


These exercises are from Page 212 of the Year 11 Mathematics Course Book and the answers are on Page 376.

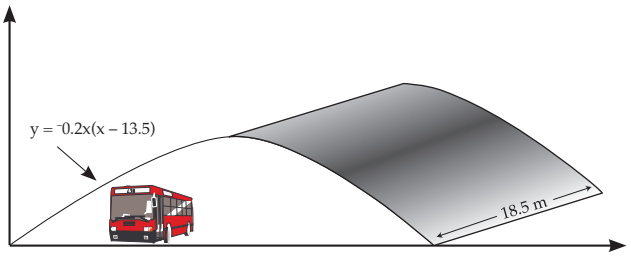
713. a), b) and c)

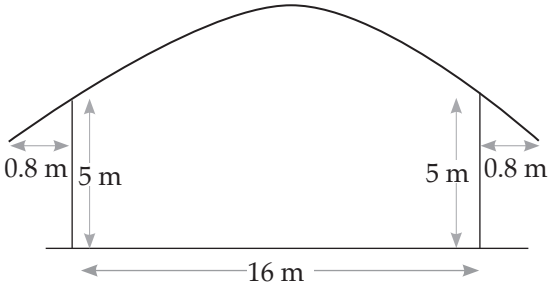


714. a), b), c) and d)



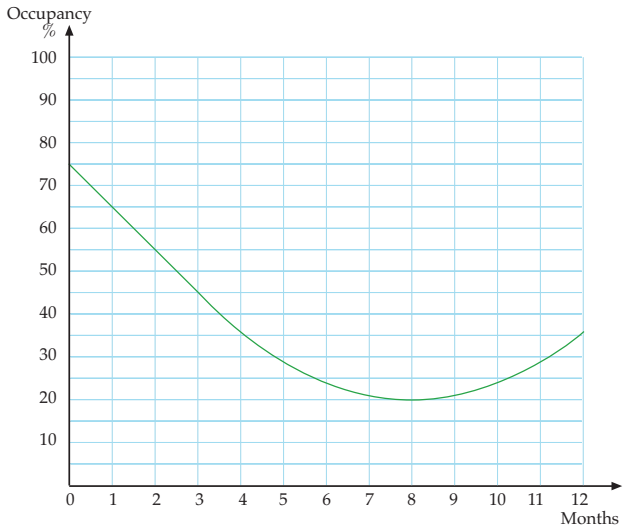
715. a), b) and c)



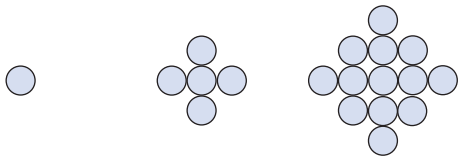


These exercises are from Page 213 of the Year 11 Mathematics Course Book and the answers are on Page 376.

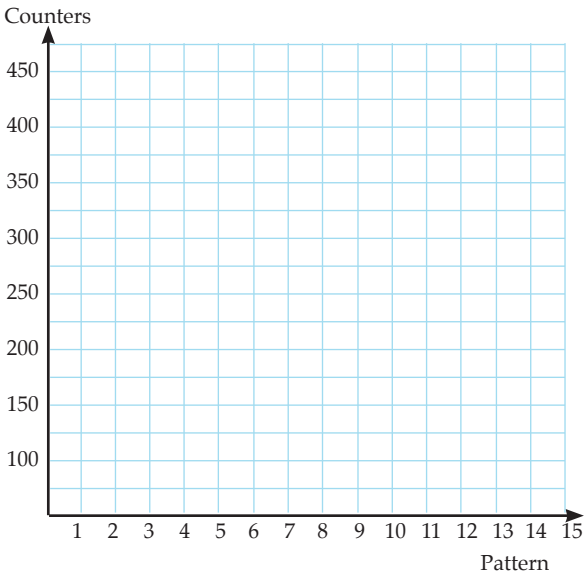
716.



717. a), b), c), d), e), f) and g)



Term	Counters	First order differences	Second order diffs. (k)	$kn^2/2$	Linear
1					
2					
3					
4					
5					
6					
7					



These exercises are from Page 215 of the Year 11 Mathematics Course Book and the answers are on Page 377.

From the Year 11 Mathematics Course Book, answer the questions - working is required.

718.

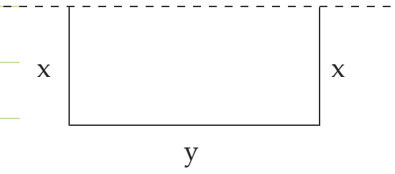
719.

720.

721.

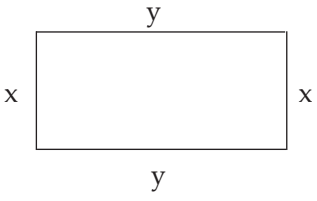
722.

723.



724.

725.



These exercises are from Page 215 of the Year 11 Mathematics Course Book and the answers are on Page 377.

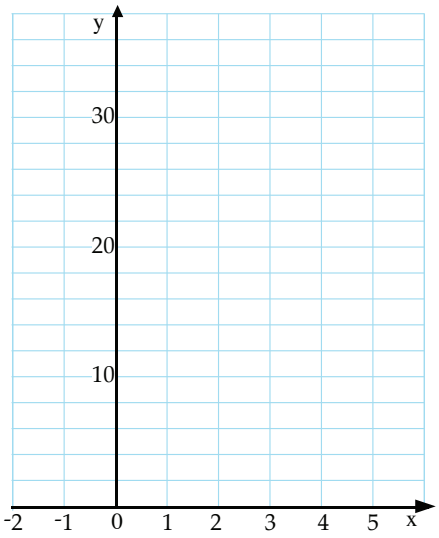
726.

These exercises are from Page 217 of the Year 11 Mathematics Course Book and the answers are on Page 377.

From the Year 11 Mathematics Course Book, graph the exponential functions of the form $y = a^x + c$, where a is a natural number, by first completing the table of values.

727. $y = 3^x$

x	$y = 3^x$
$^-2$	0.1111
$^-1$	0.3333
0	
1	
2	
3	

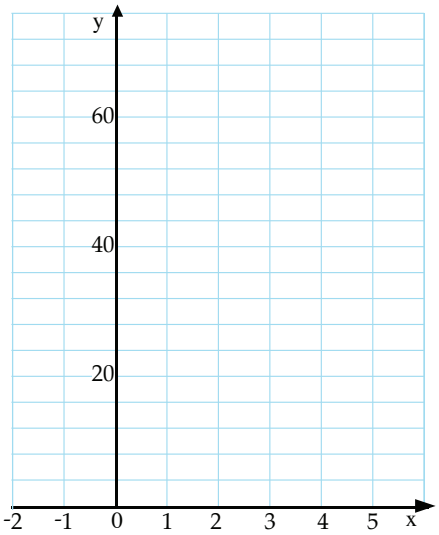


728. $y = 3^x + 6$

x	$y = 3^x + 6$
$^-2$	
$^-1$	
0	
1	
2	
3	

729. $y = 4^x$

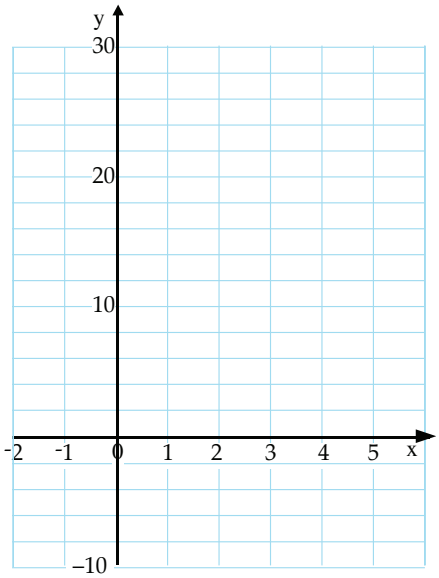
x	$y = 4^x$
$^-2$	0.0625
$^-1$	
0	
1	
2	
3	



These exercises are from Page 217 of the Year 11 Mathematics Course Book and the answers are on Page 377.

730. $y = 4^x - 2$

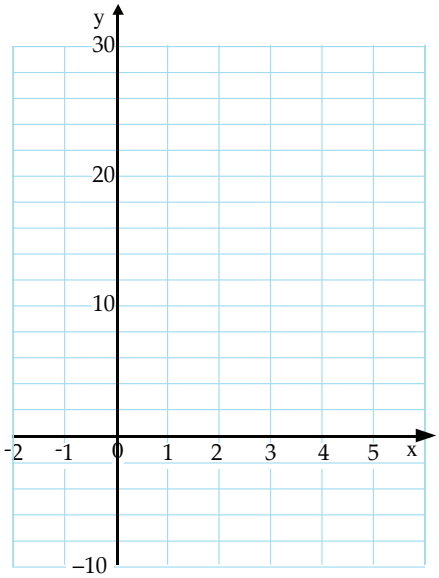
x	$y = 4^x - 2$
$^-2$	
$^-1$	
0	
1	
2	
3	



These exercises are from Page 218 of the Year 11 Mathematics Course Book and the answers are on Page 377.

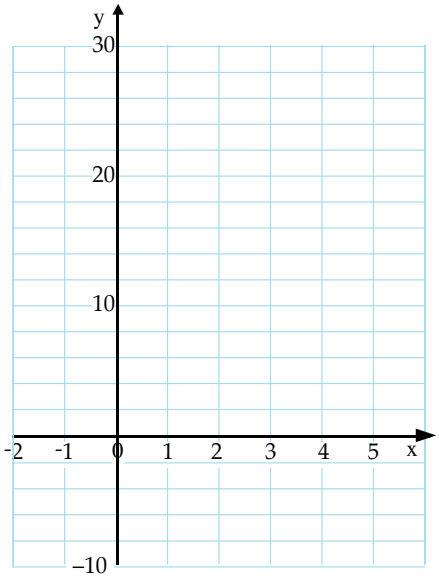
731. $y = 2^x - 5$

x	$y = 2^x - 5$
$^-1$	
0	
1	
2	
3	
4	



732. $y = 2^x + 8$

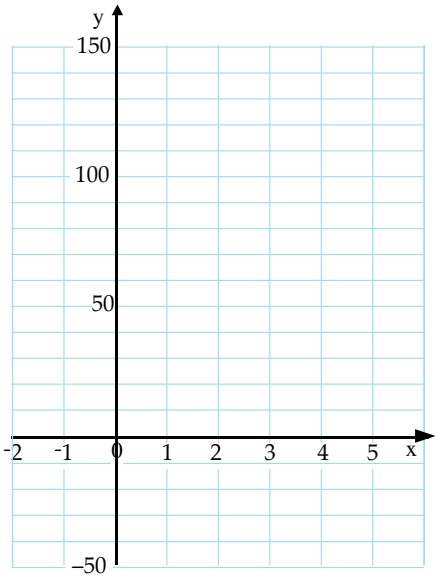
x	$y = 2^x + 8$
$^-1$	
0	
1	
2	
3	
4	



These exercises are from Page 218 of the Year 11 Mathematics Course Book and the answers are on Page 377.

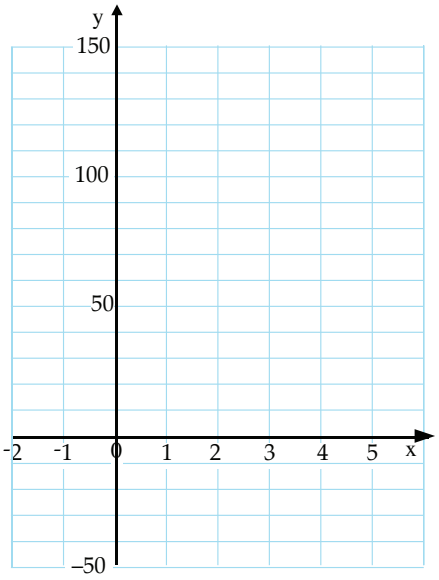
733. $y = 5^x - 10$

x	$y = 5^x - 10$
−2	
−1	
0	
1	
2	
3	



734. $y = 5^x + 20$

x	$y = 5^x + 20$
−2	
−1	
0	
1	
2	
3	



These exercises are from Page 220 of the Year 11 Mathematics Course Book and the answers are on Page 377.

From the Year 11 Mathematics Course Book, solve the exponent equations giving all solutions where they exist. Appropriate working is required.

735.

736.

737.

738.

739.

740.

These exercises are from Page 220 of the Year 11 Mathematics Course Book and the answers are on Page 377.

741.

742.

743.

744.

745.

746.

747.

748.

749.

750.

751.

752.

753.

754.

755.

756.

757.

758.

From the Year 11 Mathematics Course Book, solve the inequalities.

759.

760.

761.

These exercises are from Page 220 of the Year 11 Mathematics Course Book and the answers are on Page 377.

From the Year 11 Mathematics Course Book, solve the inequalities.

762.

763.

764.

These exercises are from Page 222 of the Year 11 Mathematics Course Book and the answers are on Page 377 & 378.

From the Year 11 Mathematics Course Book, complete the difference table for each of the sequences. If they are exponential find the rule that generates the sequence and the 10^{th} term.

765.

Term	Sequence	First order differences	Ratio of first order differences
1			
2			
3			
4			
5			
6			
7			

766.

Term	Sequence	First order differences	Ratio of first order differences
1			
2			
3			
4			
5			
6			
7			

767.

Term	Sequence	First order differences	Ratio of first order differences
1			
2			
3			
4			
5			
6			
7			

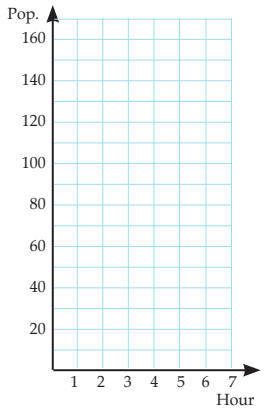
768.

Term	Sequence	First order differences	Ratio of first order differences
1			
2			
3			
4			
5			
6			
7			

These exercises are from Page 222 of the Year 11 Mathematics Course Book and the answers are on Page 378.

769. a), b), c), d) and e)

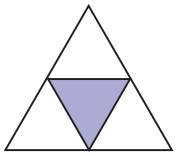
Hour	Population
1	27
2	29
3	33
4	41
5	57
6	89
7	153



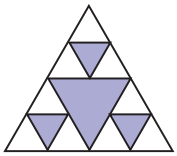
Term	Population	First order differences	Ratio of first order differences
1			
2			
3			
4			
5			
6			
7			

These exercises are from Page 223 of the Year 11 Mathematics Course Book and the answers are on Page 378.

770. a), b), c), d), e), f), g), h) and i)



Stage 1



Stage 2

Stage	Unshaded triangles	First order differences	Ratio of first order differences
1			
2			
3			
4			
5			
6			
7			

Stage	Unshaded Triangles	Shaded Triangles	Total Triangles
1			
2			
3			
4			
5			
6			
7			

CHAPTER 5

STATISTICS

- collect, explore, analyse and form conclusions with measured quantities and data
- using a statistical enquiry cycle to undertake data-based investigations
- selecting and using appropriate data visualisations to answer investigative questions or statements
- describing, explaining, and justifying features, patterns, or trends of data in proper context
- make informal inferences about well defined populations from sample data for summary and comparison situations
- make useful and appropriate predictions for comparisons, relationships and time series from visualisations
  - comparisons: shape, centre, spread
  - relationships: trend, direction, strength
  - time series: trend, seasonality, variation.
- evaluate statistical information, solutions, outcomes, and approaches from a range of perspectives

This topic may contribute to assessment of:

AS1.1 (91944) Explore data using a statistical enquiry process (Internal – 5 credits)

and build knowledge for

AS1.3 (91946) Interpret and apply mathematical and statistical information in context (External – 5 credits)

These exercises are from Page 227 of the Year 11 Mathematics Course Book and the answers are on Page 379.

From the Year 11 Mathematics Course Book, calculate the averages for the sets of data.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10. a), b), c) and d)

11.

12.

13.

These exercises are from Page 228 of the Year 11 Mathematics Course Book and the answers are on Page 379.

14.

15.

16. a) and b)

17. a) and b)

18. a) and b)

19. a) and b)

20.

21.

These exercises are from Page 231 of the Year 11 Mathematics Course Book and the answers are on Page 379 & 380.

From the Year 11 Mathematics Course Book, answer the questions.

22.

23.

24.

25.

26.

27.

28.

29.

30.

31.

These exercises are from Page 231 of the Year 11 Mathematics Course Book and the answers are on Page 380.

From the Year 11 Mathematics Course Book, answer the questions.

32.

33.

34.

35.

These exercises are from Page 232 of the Year 11 Mathematics Course Book and the answers are on Page 380.

36.

37.

These exercises are from Page 233 of the Year 11 Mathematics Course Book and the answers are on Page 381.

From the Year 11 Mathematics Course Book, investigate each twin set of data by calculating relevant statistics (averages and measures of spread for each sample and then use these statistics to describe differences.

38. Class 1: 19, 71, 42, 58, 63, 72, 64, 45, 53, 60, 52, 74, 63, 72, 63, 64, 71, 50, 32, 69, 71, 58, 58, 61, 67, 59, 56.

Class 2: 43, 82, 34, 92, 64, 52, 23, 29, 86, 37, 49, 58, 82, 79, 37, 41, 63, 72, 81, 56, 48, 73, 36, 56, 62, 45, 64.

These exercises are from Page 233 of the Year 11 Mathematics Course Book and the answers are on Page 381.

39. Farm 1: 38, 41, 42, 37, 42, 32, 37, 49, 28, 43, 34, 45, 34, 43, 29, 42, 37, 39, 45, 38, 43, 36, 32, 39, 39, 34, 32, 41, 32, 38, 36.

Farm 2: 33, 42, 37, 36, 39, 41, 39, 40, 43, 37, 49, 36, 40, 39, 37, 41, 37, 39, 41, 36, 38, 43, 36, 36, 42, 35, 34, 36, 39, 41, 39.

40. Peter: 42.4, 39.5, 43.2, 47.2, 31.6, 40.2, 41.4, 38.5, 29.5, 34.4.

Quade: 37.8, 41.2, 40.8, 42.4, 41.2, 36.7, 42.3, 41.9, 34.2, 35.7.

41. Jim: 8.5, 8.9, 8.4, 7.8, 9.2, 8.6, 10.1, 7.8, 8.2, 8.0, 8.6, 9.7, 8.1, 7.8, 9.7, 8.4, 8.8, 9.8, 7.9, 9.2.

Ken: 8.4, 8.6, 8.7, 8.8, 8.2, 8.6, 8.5, 8.8, 9.2, 8.7, 8.6, 8.7, 8.9, 8.8, 8.7, 8.4, 8.8, 8.3, 8.9, 8.2.

42. Home 1: 450, 526, 562, 774, 756, 666, 720, 562, 493, 547, 788, 1098, 450, 608, 842, 1483, 633, 540, 1224, 868, 511, 828, 857 and 871 kWh/month.

Home 2: 1180, 486, 1955, 187, 1177, 601, 940, 403, 396, 1670, 1116, 1904, 947, 788, 1544, 925, 1552, 220, 104, 1612, 263, 1210, 1282 and 223 kWh/month

43.

Tau.	22	21	19	17	16	14
	14	14	16	17	18	19
Te An.	18	18	17	16	12	8
	8	11	13	14	16	17

These exercises are from Page 234 of the Year 11 Mathematics Course Book and the answers are on Page 381 & 382.

44. Home 1: 125, 146, 156, 215, 185, 210, 185, 200, 156, 137, 152, 219, 305, 125, 169, 234, 412, 176, 150, 340, 241, 142, 230, 238 and 242 Mb/day.

Home 2: 328, 135, 543, 52, 327, 167, 261, 142, 110, 464, 31, 529, 263, 219, 28, 429, 257, 432, 61, 29, 448, 73, 336, 356 and 62 Mb/day.

45.

Kai.	82	79	78	95	119	149
	166	152	133	93	94	97
NP	97	95	117	131	124	145
	143	127	110	124	108	103

These exercises are from Page 236 of the Year 11 Mathematics Course Book and the answers are on Page 382.

From the Year 11 Mathematics Course Book, complete the frequency table then calculate appropriate statistics. Describe the data and justify any conclusions.

46.

Tickets	Tally	Freq. f
2		
4		
6		
8		
10		
12		
	Total	

47.

Days	Tally	Freq. f
0		
2		
4		
6		
8		
16		
	Total	

48.

Days	Tally	Freq. f
6		
7		
8		
9		
10		
11		
12		
	Total	

49.

Fish	Tally	Freq. f
	Total	

These exercises are from Page 236 of the Year 11 Mathematics Course Book and the answers are on Page 382.

50. a), b), c) and d)

Level of Ni (ppm)	Tally	Midpoint (x)	Frequency (f)
0 – < 5			
	TOTAL		

These exercises are from Page 241 of the Year 11 Mathematics Course Book and the answers are on Page 382 & 383.

From the Year 11 Mathematics Course Book, use statistical graphs to demonstrate your understanding of data and interpret the statistical graphs, justifying any statements and findings.

51. Dot plot of grams of sugar

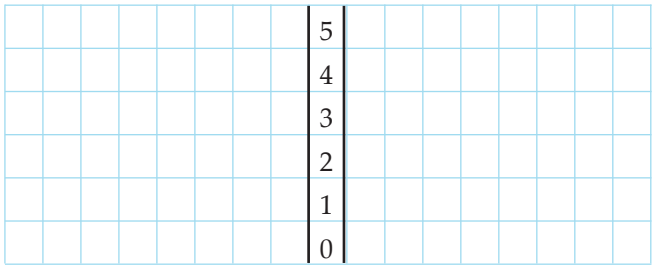
Yoghurt

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 (g)

Cereal

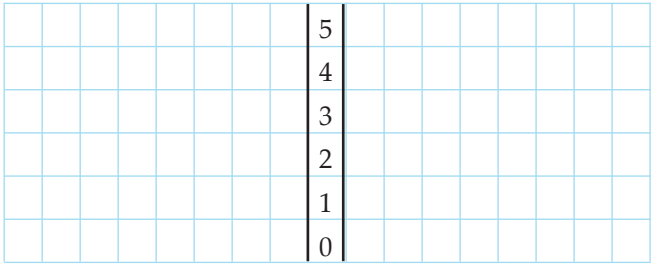
52.

Stem and Leaf plot of cell phone calls (unordered)



Females Males

Stem and Leaf plot of cell phone calls



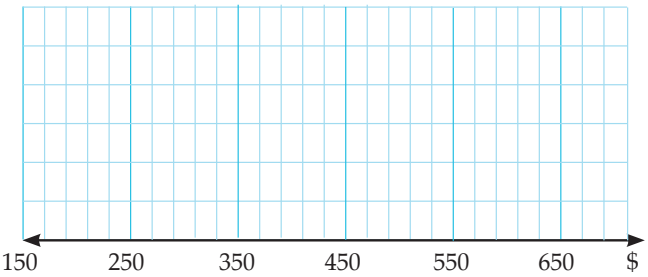
Females Males

These exercises are from Page 241 of the Year 11 Mathematics Course Book and the answers are on Page 383.

53. a), b) and c)

	Female ($)	Male ($)
Min.		
LQ		
Median		
UQ		
Max.		

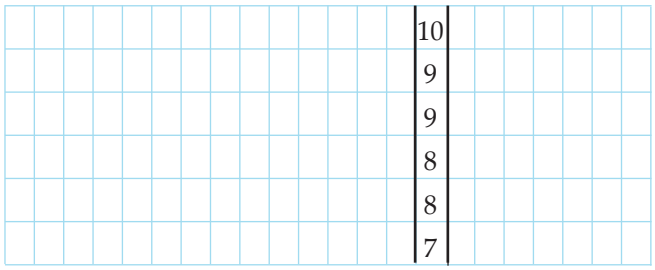
Box and Whisker plot of take-home pay



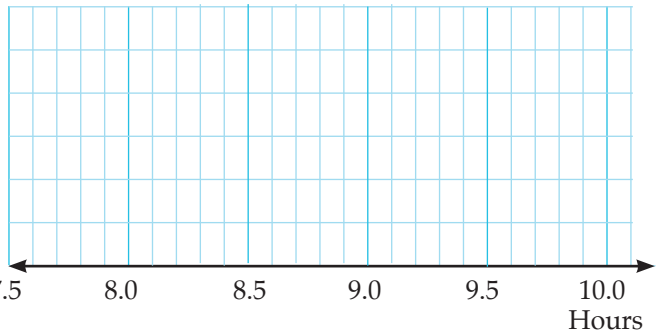
These exercises are from Page 242 of the Year 11 Mathematics Course Book and the answers are on Page 383.

54.

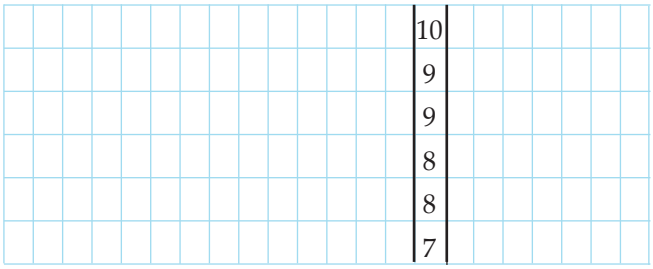
Stem and Leaf plot of driving times (unordered)



Box and Whisker plot of driving times



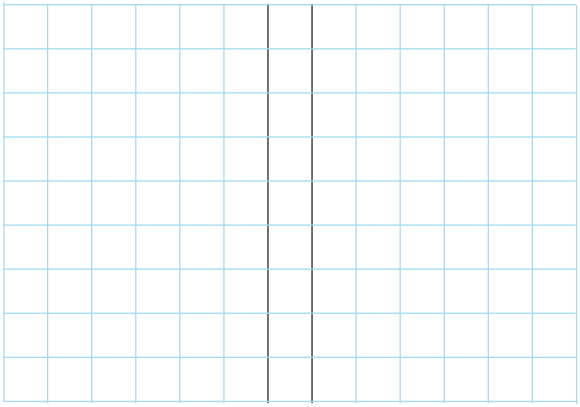
Stem and Leaf plot of driving times



These exercises are from Page 242 of the Year 11 Mathematics Course Book and the answers are on Page 383.

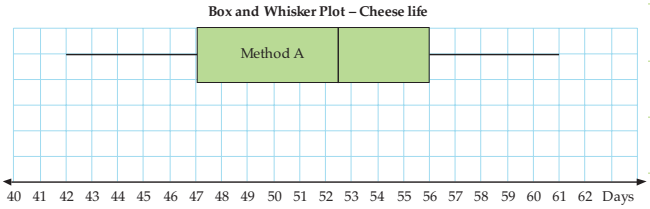
55. a) and b)

56. a) and b)



These exercises are from Page 243 of the Year 11 Mathematics Course Book and the answers are on Page 383.

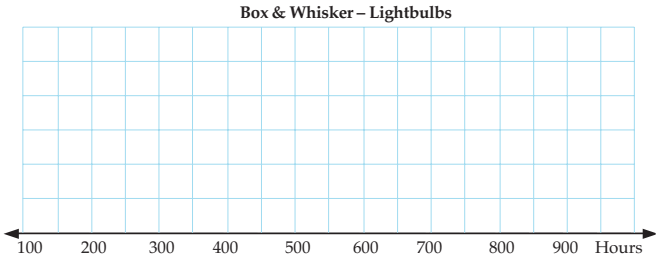
57. a) and b)



These exercises are from Page 243 of the Year 11 Mathematics Course Book and the answers are on Page 383.

58. a), b) and c)

	Everglow (h)	Wonderlight (h)
Min.	150	300
LQ	300	375
Median	425	550
UQ	675	775
Max.	800	875



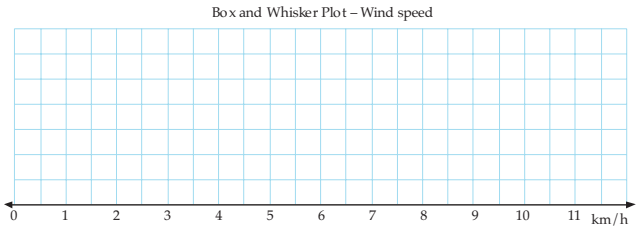
These exercises are from Page 243 & 244 of the Year 11 Mathematics Course Book and the answers are on Page 383.

59. a), b), c) and d)

May	Wind (km/h)	August	Wind (km/h)
1	1.8	1	4.1
2	1.3	2	5.7
3	2.6	3	3.9
4	1.2	4	2.6
5	2.0	5	4.4
6	0.9	6	2.1
7	3.4	7	2.8
8	3.0	8	2.4
9	2.1	9	2.9
10	2.0	10	2.3
11	1.2	11	4.1
12	0.5	12	1.5
13	1.3	13	4.4
14	4.9	14	4.2
15	7.9	15	7.6
16	2.8	16	3.4
17	3.2	17	1.3
18	7.7	18	2.9
19	6.2	19	6.8
20	9.3	20	8.2

May	Wind (km/h)	August	Wind (km/h)
21	9.7	21	4.7
22	8.1	22	4.7
23	10.3	23	0.3
24	3.5	24	7.4
25	4.7	25	4.0
26	1.2	26	4.7
27	4.5	27	1.0
28	2.0	28	0.8
29	2.6	29	1.2
30	5.7	30	5.6
31	1.2	31	6.8

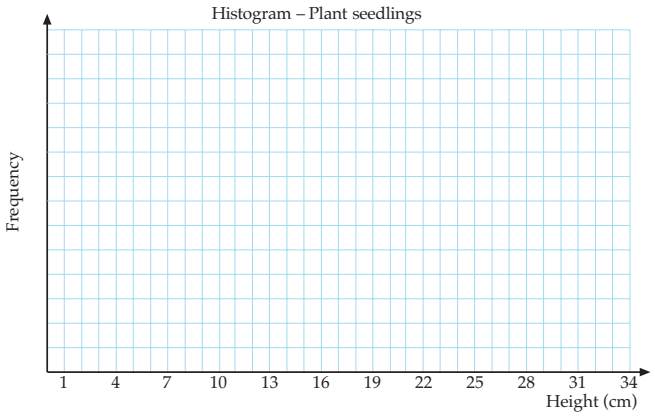
	May	August
Min.		
LQ		
Median		
UQ		
Max.		
Mean		



These exercises are from Page 244 of the Year 11 Mathematics Course Book and the answers are on Page 384.

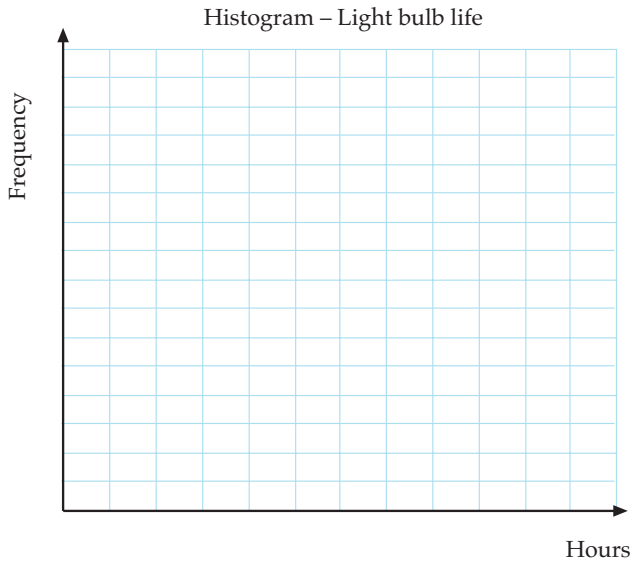
60. a), b), c), d), e), f) and g)

Height (cm)	Mid-point	Tally	Freq. f
4 – <7			
7 – <10			
10 – <13			
13 – <16			
16 – <19			
19 – <22			
22 – <25			
25 – <28			
28 – <34			
		Total	



61. a), b), c) and d)

Hours	Number of light bulbs
300 – 399	12
400 – 499	43
500 – 599	55
600 – 699	78
700 – 799	72
800 – 899	60
900 – 999	45
1000 – 1099	27
1100 – 1199	8

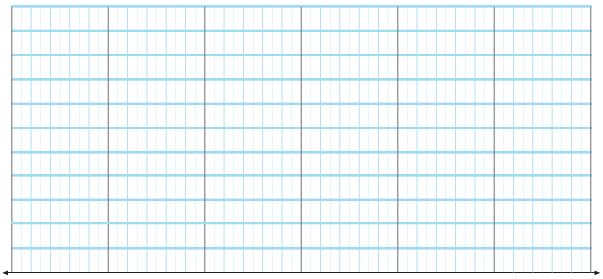


These exercises are from Page 245 of the Year 11 Mathematics Course Book and the answers are on Page 384.

62. a), b) and c)

Results	Female	Male
Min.		
LQ		
Median		
UQ		
Max.		

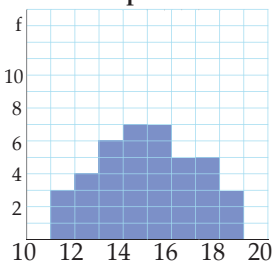
Box and Whisker Plot - Throwing competition



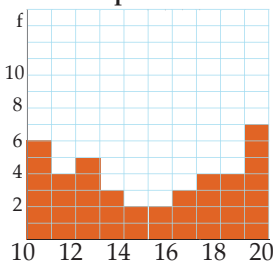
63. a), b) and c)

Histogram – Swim times (secs)

Sample A



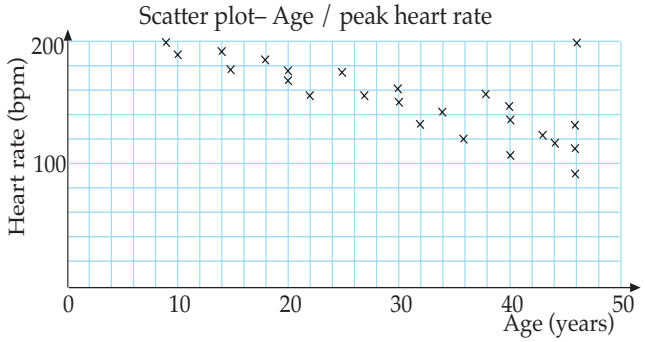
Sample B



These exercises are from Page 251 of the Year 11 Mathematics Course Book and the answers are on Page 384.

64. a), b), c), d), e), f), g) h), i) and j)

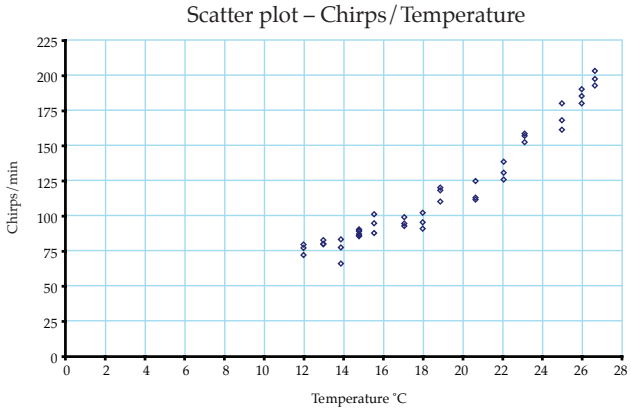
Scatter plot– Age / peak heart rate



64. cont...

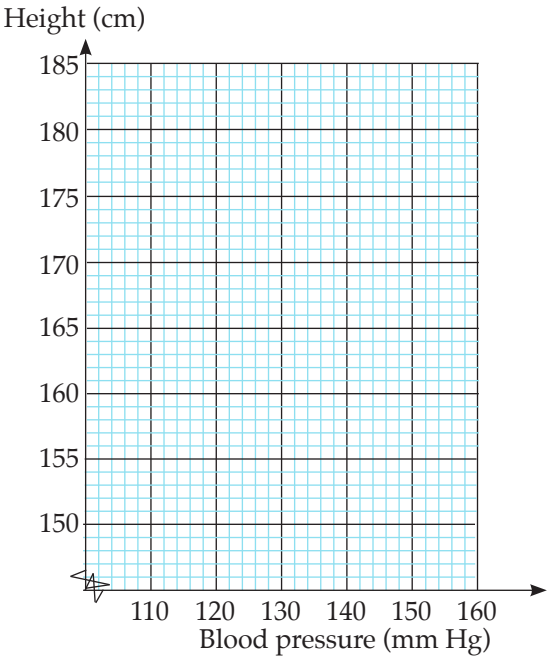
These exercises are from Page 251 & 252 of the Year 11 Mathematics Course Book and the answers are on Page 385.

65. a), b), c), d), e), f), g) and h)



66. a), b), c), d), e), f), g) h) and i)

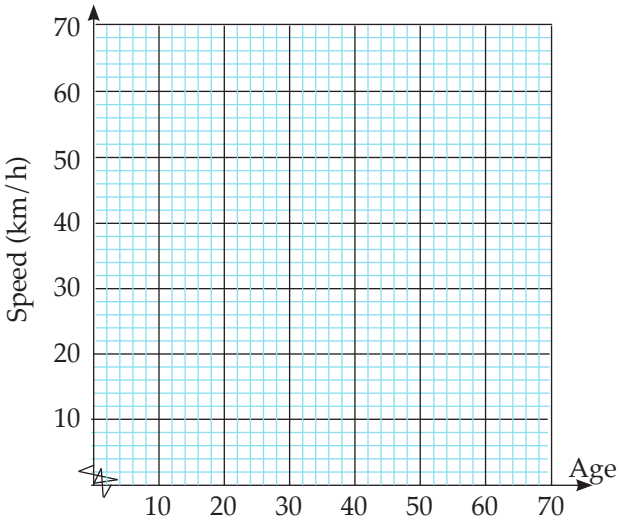
Male	1	2	3	4	5
Blood pressure (mm Hg)	116	120	118	125	120
Height (cm)	180	178	176	175	172
Male	6	7	8	9	10
Blood pressure (mm Hg)	134	150	140	144	150
Height (cm)	170	172	165	162	161
Male	11	12	13	14	15
Blood pressure (mm Hg)	135	155	120	115	148
Height (cm)	172	160	175	180	162
Male	16	17	18	19	20
Blood pressure (mm Hg)	145	138	110	148	134
Height (cm)	158	171	185	173	166



66. cont...

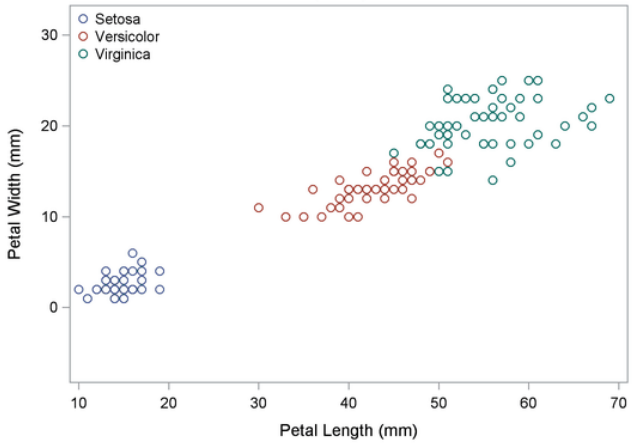
These exercises are from Page 252 of the Year 11 Mathematics Course Book and the answers are on Page 385 & 386.

67. a), b), c), d), e), f), g) h) and i)

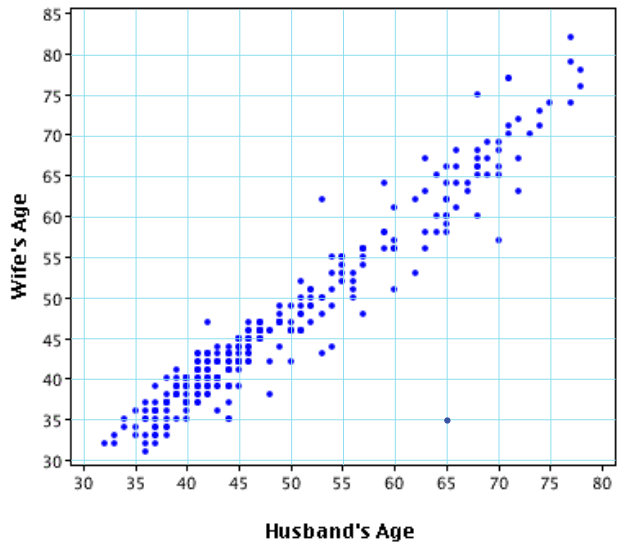


These exercises are from Page 253 of the Year 11 Mathematics Course Book and the answers are on Page 386 & 387.

68. a), b), c), d), e) and f)



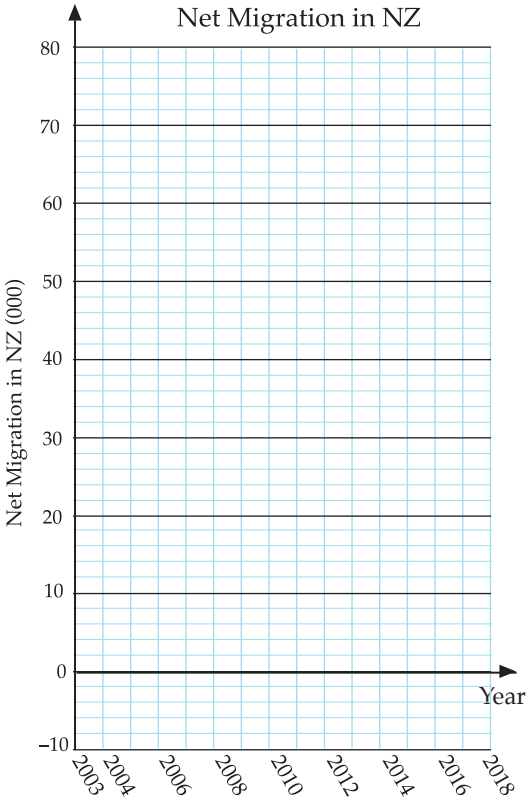
69. a), b), c), d), e), f) and g)



These exercises are from Page 254 of the Year 11 Mathematics Course Book and the answers are on Page 387.

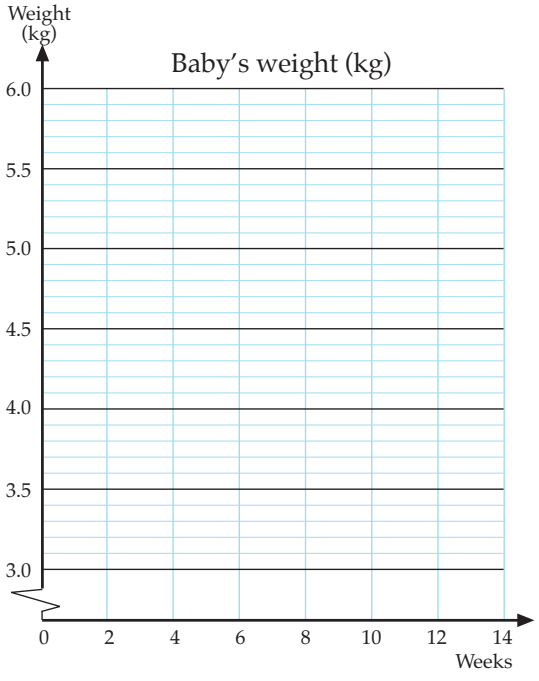
70. a), b), c), d) and e)

Year	Net Migration	Year	Net Migration
2003	42 500	2011	3900
2004	2200	2012	⁻3200
2005	8600	2013	7900
2006	10 700	2014	38 300
2007	10 100	2015	58 300
2008	4700	2016	69 100
2009	12 500	2017	72 300
2010	16 500	2018	65 000



71. a), b), c), d), e), f) and g)

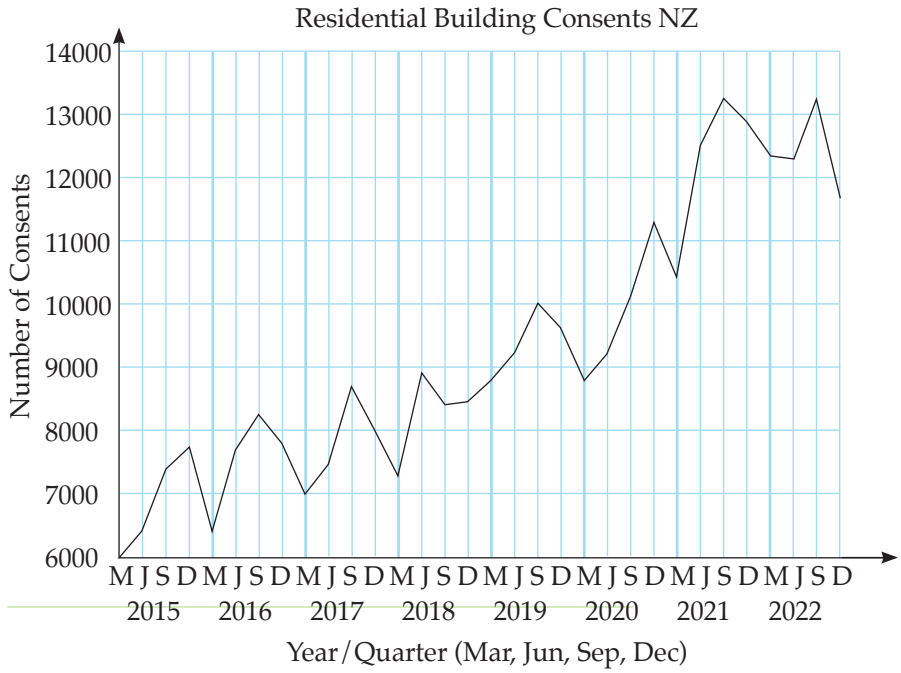
Age (wks)	0	2	4	6	8	10	12	14
Mass (kg)	3.0	3.8	4.4	4.2	4.8	5.3	5.5	6.0



71. cont...

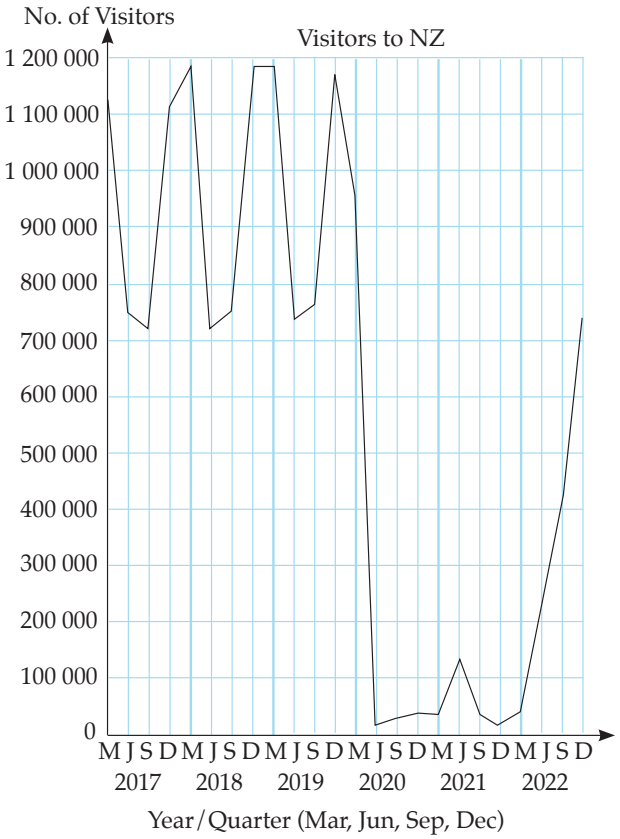
These exercises are from Page 255 of the Year 11 Mathematics Course Book and the answers are on Page 387.

72. a), b), c), d), e), f) and g)



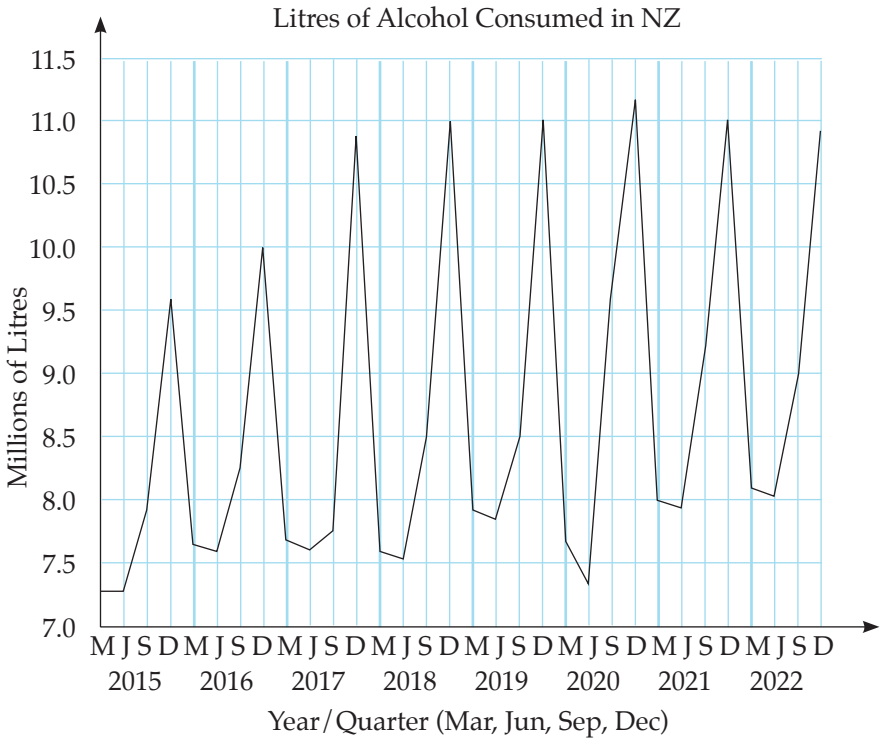
These exercises are from Page 255 of the Year 11 Mathematics Course Book and the answers are on Page 387.

73. a), b), c), d) and e)



These exercises are from Page 256 of the Year 11 Mathematics Course Book and the answers are on Page 387 & 388.

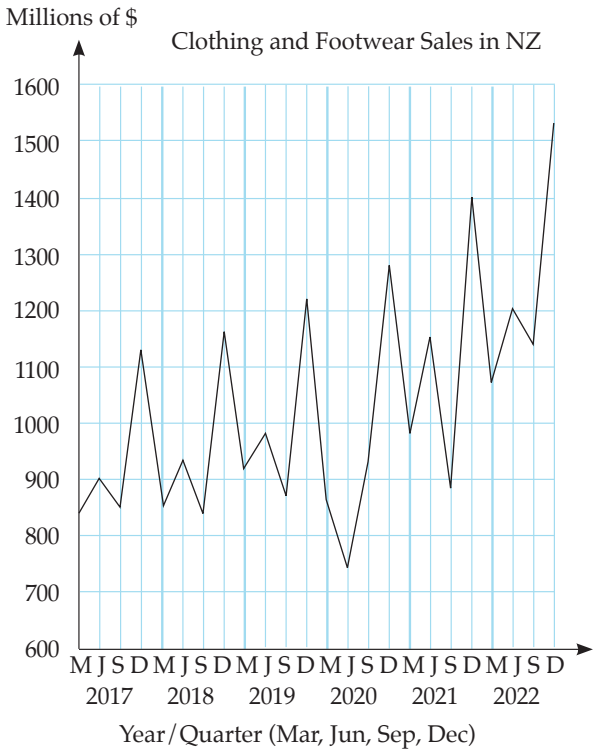
74. a), b), c), d), e), f) and g)



74. cont...

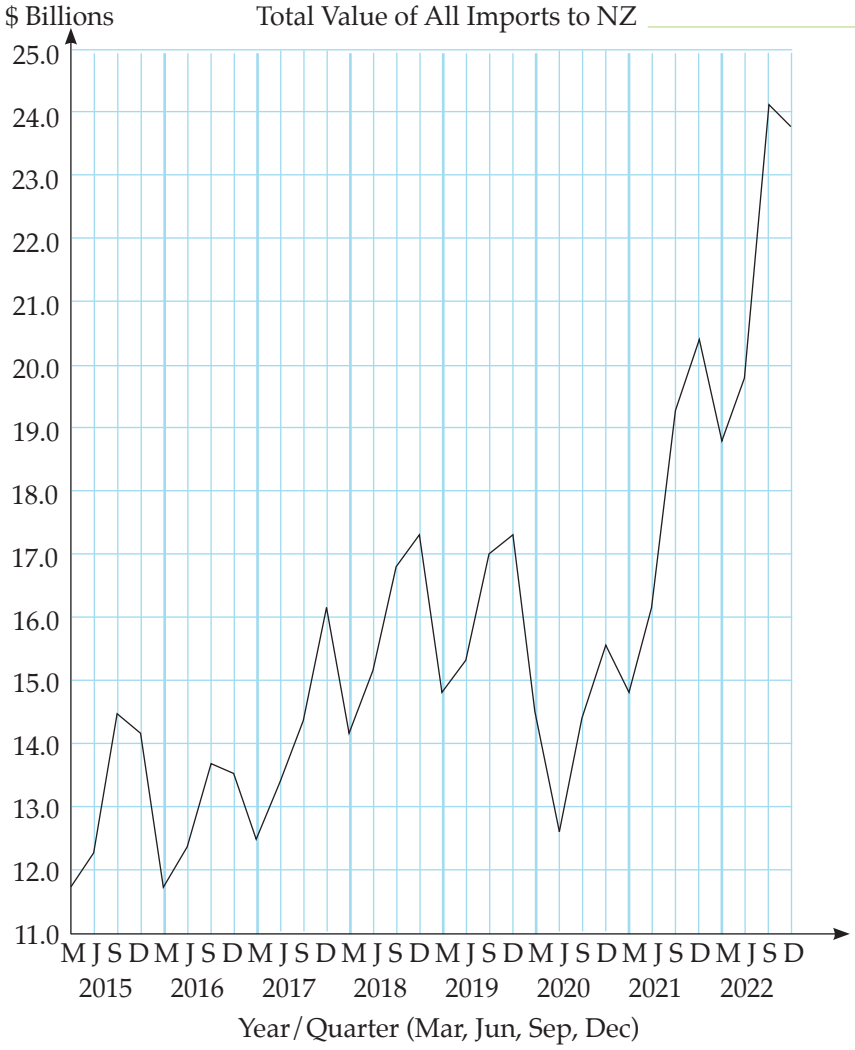
These exercises are from Page 256 of the Year 11 Mathematics Course Book and the answers are on Page 388.

75. a), b), c), and d)

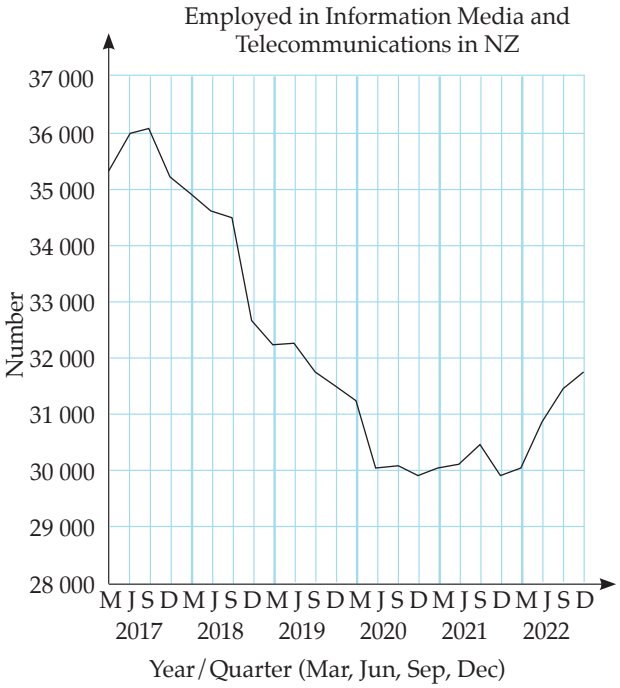


These exercises are from Page 257 of the Year 11 Mathematics Course Book and the answers are on Page 388.

76. a), b), c), d) and e)



77. a), b), c) and d)

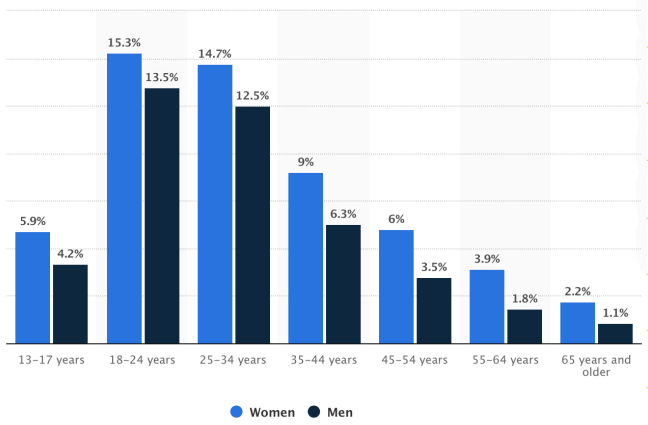


77. cont...

These exercises are from Page 258 of the Year 11 Mathematics Course Book and the answers are on Page 388.

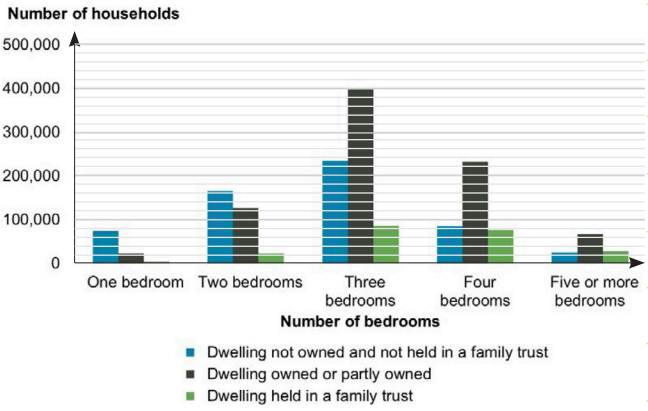
78. a), b), c), d) and e)

Instagram Users NZ, June 2022



79. a), b), c), d) and e)

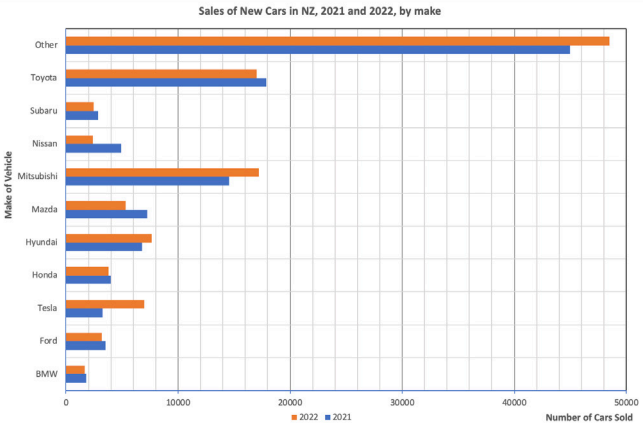
Dwelling size and type of ownership NZ.



These exercises are from Page 258 of the Year 11 Mathematics Course Book and the answers are on Page 389.

80. a), b), c) and d)

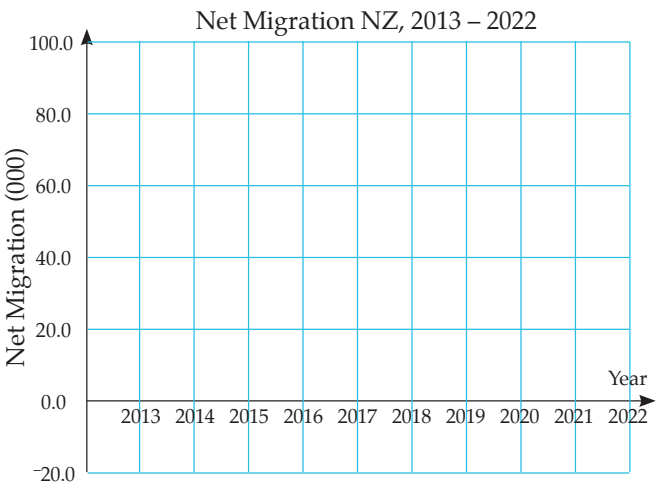
Make	Number of new cars sold in NZ by make 2021	2022
BMW	1824	1656
Ford	3531	3168
Tesla	3270	6980
Honda	3978	3820
Hyundai	6776	7638
Mazda	7217	5283
Mitsubishi	14 564	17 219
Nissan	4941	2397
Subaru	2833	2461
Toyota	17 855	16 977
Other	44 994	48 523
Total	**111 783**	**116 122**



These exercises are from Page 259 of the Year 11 Mathematics Course Book and the answers are on Page 389.

81. a), b), c), d) and e)

Year	2013	2014	2015	2016	2017
Migration (000)	−5.8	26.8	51.3	63.2	61.3
Year	2018	2019	2020	2021	2022
Migration (000)	50.9	49.7	91.7	−1.8	−19.3

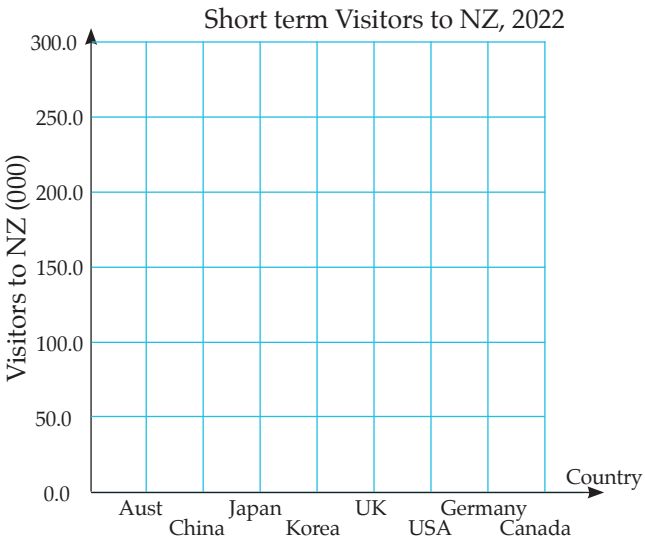


81. cont...

These exercises are from Page 259 of the Year 11 Mathematics Course Book and the answers are on Page 389.

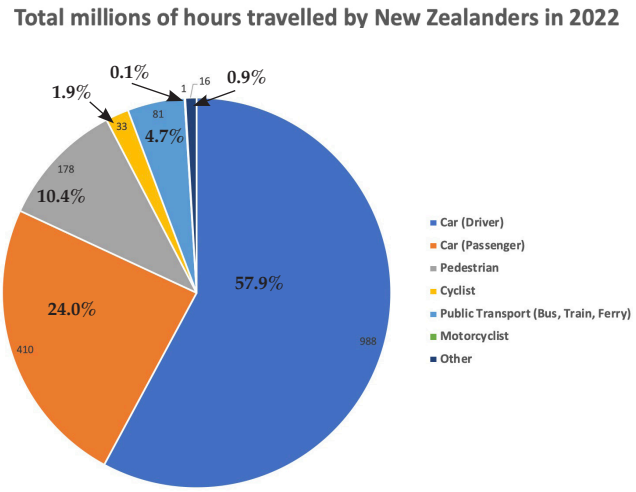
82. a), b), c) and d)

Country	Aust.	China	Japan	Korea
Visitors (000)	286	2.7	4.6	6.7
Country	UK	USA	Germany	Canada
Visitors (000)	19.8	53.0	14.2	8.7



These exercises are from Page 260 of the Year 11 Mathematics Course Book and the answers are on Page 389.

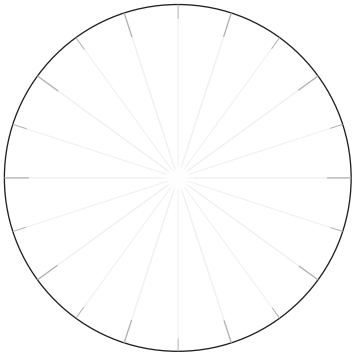
83. a), b), c), d) and e)

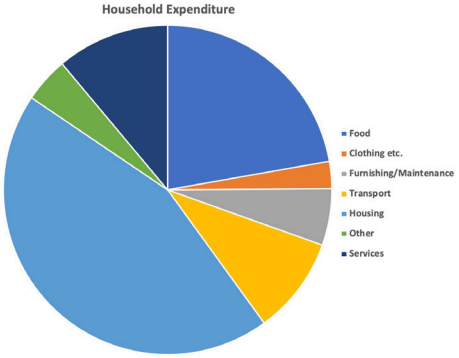


84. a), b), c), d) and e)

Household area	Percent %	Household area	Percent %
Food	18%	Housing	30%
Clothing and footwear	3%	Other purchases	10%
Furnishing and Maintenance	13%	Services	15%
Transport and travel	11%		

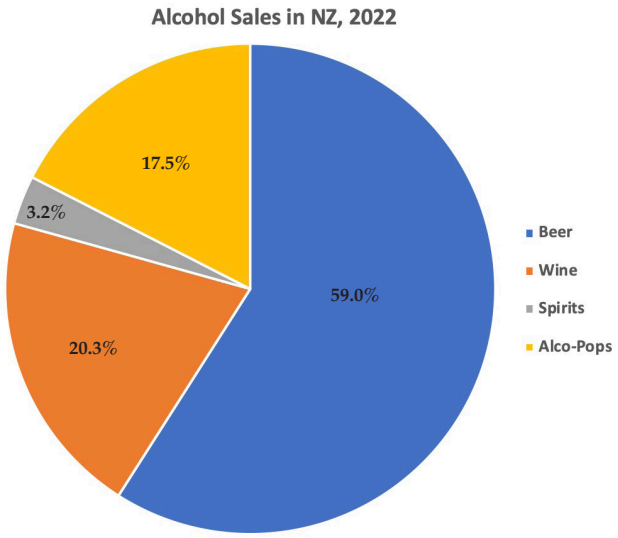
Total household spending



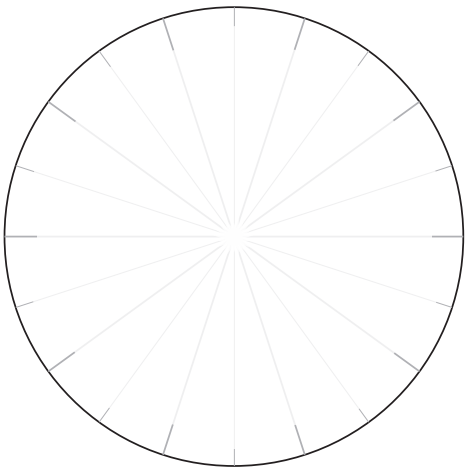


These exercises are from Page 261 of the Year 11 Mathematics Course Book and the answers are on Page 389 & 390.

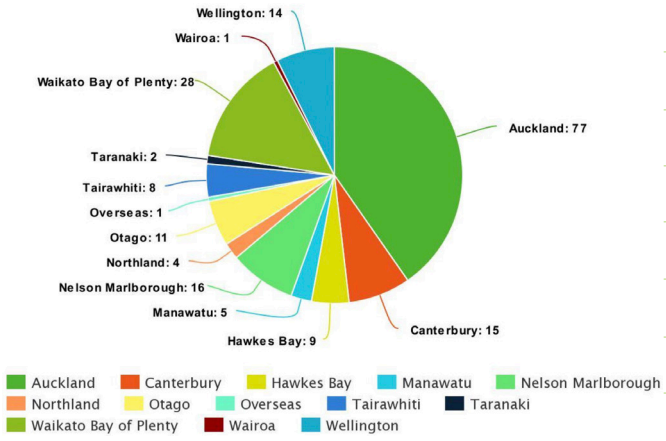
85. a), b), c), d), e) and f)



Drink	Beer	Wine	Alco-pops	Spirits
Alcohol (million L)	12	16	4	4



86. a), b), c), d) and e)



86. cont...

These exercises are from Page 264 of the Year 11 Mathematics Course Book and the answers are on Page 390.

From the Year 11 Mathematics Course Book, for each identify which is the explanatory variable (x) and which the response variable (y). If either variable can act as the explanatory or response variable, without further information being given, say so.

87.

88.

89.

90.

91.

92.

93.

94.

95.

96.

97.

98.

99.

100.

These exercises are from Page 265 of the Year 11 Mathematics Course Book and the answers are on Page 390 & 391.

From the Year 11 Mathematics Course Book, answer the questions.

101.

102.

103.

104.

105.

106.

107.

108.

109.

110.

111.

112.

113.

114.

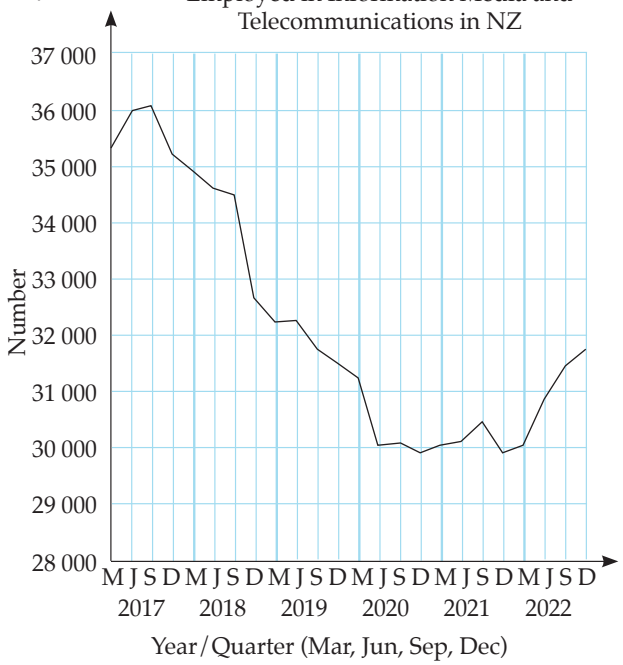
115.

116.

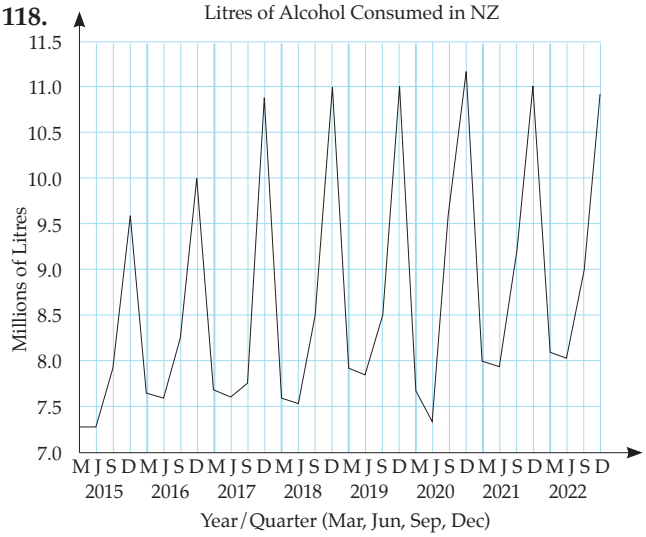
These exercises are from Page 266 of the Year 11 Mathematics Course Book and the answers are on Page 391.

From the Year 11 Mathematics Course Book, identify and explain the variable(s) used in the time series graphs as well as the group of interest.

117.

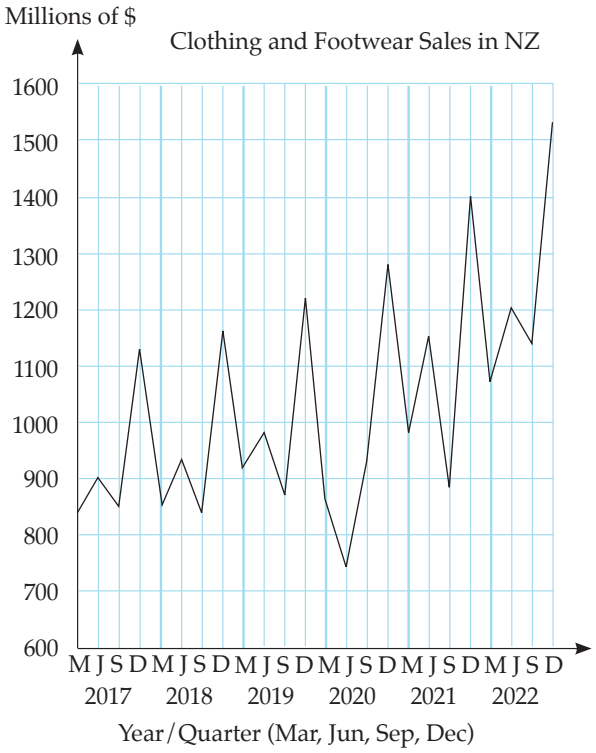


118.



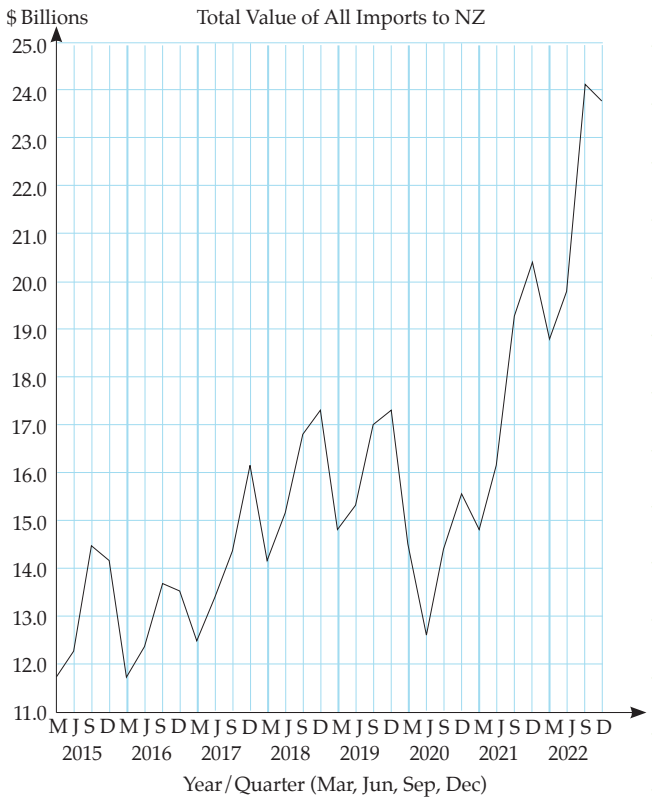
These exercises are from Page 267 of the Year 11 Mathematics Course Book and the answers are on Page 391.

119.

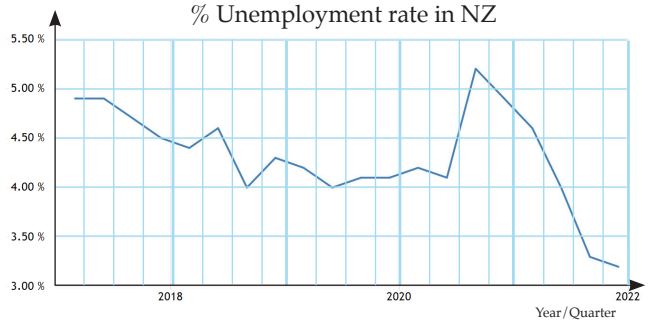


These exercises are from Page 267 of the Year 11 Mathematics Course Book and the answers are on Page 391.

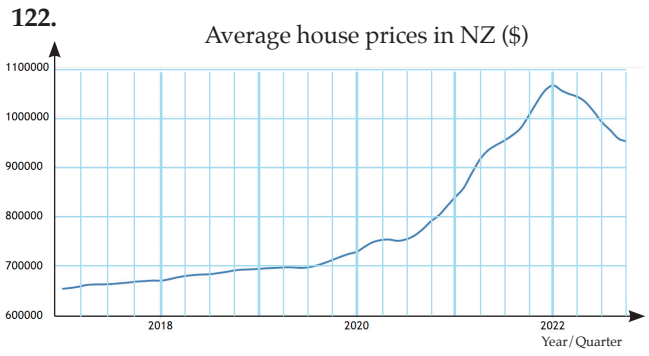
120.



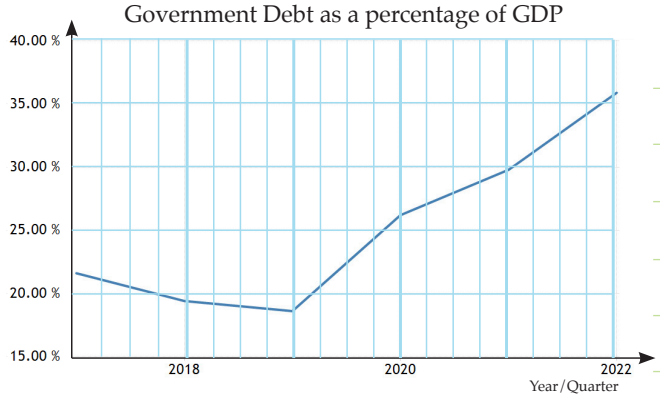
121.



122.

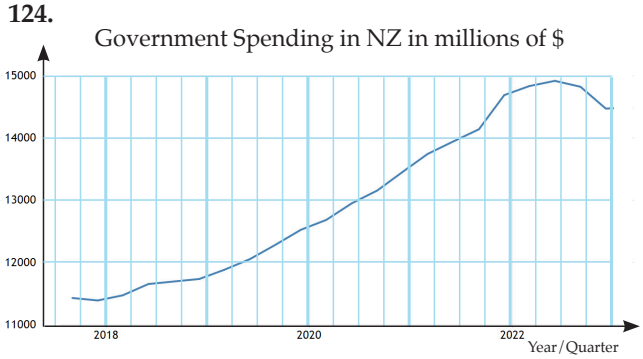


123.



These exercises are from Page 267 of the Year 11 Mathematics Course Book and the answers are on Page 391.

124.



These exercises are from Page 273 of the Year 11 Mathematics Course Book and the answers are on Page 391.

From the Year 11 Mathematics Course Book, inspect the tables and clean data values that you judge are not appropriate. Justify each data value cleaned. Only a part of each table is shown.

125.

	A	B
1	Height (cm)	Armspan (cm)
2	190	201
3	145	142
4	159	159
5	154	159
6	161	164
7	168	
8	180	180
9	160	180
10	173	162
11	165	163
12	174	168
13	164	158
14	161	162
15	150	160
16	129	1.81
17	172	172
18	435	127
19	179	174
20	141	145
21	17	168
22	159	160
23	179	176
24	n/a	156
25	174	180
26	156	161
27	152	145.8
28	155	155
29	172	160
30	153	157

126.

	A	B
1	Shoulder width (cm)	Bag weight (kg)
2	63	2.6
3	30	4000
4	38	2.0
5	34	4.0
6	42	0.0
7	40	3.2
8	45	6.0
9	50	3.0
10	55	2.3
11		4.4
12	45	2.0
13	39	3.0
14	40	5.1
15	34	n/a
16	41	5.5
17	430	2.3
18	28	1.0
19	45	6.0
20	30	1.1
21	45	1.4
22	0.36	4.2
23	50	5.0
24	45	2.55
25	52	2.2
26	36	6.8
27	38	1.9
28	44	2.7
29	50	3.0
30	39	5.0

127.

	A	B
1	Weight (kg)	Reaction time (secs)
2	54.6	0.411
3	43.2	0.431
4	65.3	0.521
5	37.9	0.481
6	455	0.791
7	87.9	0.414
8	74.7	0.280
9	69.6	0.408
10	74.3	0.395
11	39.7	0.481
12	41.2	0.620
13	45.6	0.538
14	53.1	0.740
15	48.2	0.489
16	66.8	0.002
17	71.4	0.522
18	8.85	0.375
19	71.2	0.468
20	70.6	9.520
21	92.4	0.439
22	240.3	0.395
23	86.2	0.345
24	39.8	0.418
25	0.538	0.572
26	40.3	0.697
27	37.5	0.481
28	15.3	0.370
29	39.8	0.511
30	43.2	0.299

These exercises are from Page 273 of the Year 11 Mathematics Course Book and the answers are on Page 391.

128.

	A	B
1	Elevation (m)	Mean Annual Temp (°C)
2	0	24.6
3	400	21.2
4	2100	76.0
5	1600	12.4
6	1000	15.3
7	1200	14.6
8	700	20.9
9	1300	13.9
10	1000	25.1
11	2200	7.8
12	1900	9.2
13	1400	14.0
14	1500	11.2
15	300	20.8
16	1100	15.8
17	1000	16.4
18	1800	5.1
19	1400	20.9
20	100	22.6
21	900	17.2
22	600	19.3
23	200	18.7
24	300	20.5
25	120	12.8

130.

	Fwd / Bk.	Games this year	Weight kg	Injuries / year.
Player A	F	1	108 kg	1
Player B	B	11	10.5	5
Player C	F	14	98	2
Player D	B	13	56	7
Player E	B	26	87	4
Player F	Both	14	84	5
Player G	B	12	96	2

These exercises are from Page 274 of the Year 11 Mathematics Course Book and the answers are on Page 392.

From the Year 11 Mathematics Course Book, inspect the tables and identify and clean data values that you judge are not appropriate. Justify each data value cleaned and identify any poor choice of variables being used. Only a small part of each table is shown.

129.

	Year Level	Hours of Hmwk.	Texts / day	Sport in hours
Student A	10	30	350	
Student B	10	1	0	0
Student C	11	0	23	0
Student D	11	1	51	2
Student E	10	2	28	3
Student F	11	0	81	0
Student G	11	2.5	34	0

131.

	Gender	Facebook hours / day	Texts received / day	Time getting home
Student A	F	na	57	30
Student B	M	5	1	15
Student C	M	1.5	12	4 h
Student D	F	40 min	41	35
Student E	boy	1	15	25
Student F	boy	0	45	1
Student G	girl	1.20	12	40

These exercises are from Page 274 of the Year 11 Mathematics Course Book and the answers are on Page 392.

132.

	Age	Time in Mall (min)	Number of Parcels	Amount spent
Shopper A	<18	5	2	50
Shopper B	<18	45	3	185
Shopper C	16	60	0	25
Shopper D	≥18	30	7	210
Shopper E	≥18	25	6	120
Shopper F	<18	45	0	0
Shopper G	18	55	11	30

These exercises are from Page 276 of the Year 11 Mathematics Course Book and the answers are on Page 392.

From the Year 11 Mathematics Course Book, use your calculator to select a random sample from the identified population. You need to explain how each member of the population gets a position or number, the key stokes you will use and list the output of each sample of 30.

133.

134.

These exercises are from Page 277 of the Year 11 Mathematics Course Book and the answers are on Page 392.

From the Year 11 Mathematics Course Book, use your calculator to generate random samples at the specified sample size from the population on pages 279 and 280. Calculate the statistics required and plot a box and whisker plot above the graph of the population on the next page. Comment on the sampling variability between samples from the one population.

135.

	Pop. data	Sample 1 n = 30	Sample 2 n = 30	Sample 3 n = 30
Min.	123 cm			
LQ	161 cm			
Median	167 cm			
UQ	174 cm			
Max.	201 cm			

136.

	Pop. data	Sample 1 n = 100	Sample 2 n = 100
Min.	123 cm		
LQ	161 cm		
Median	167 cm		
UQ	174 cm		
Max.	201 cm		

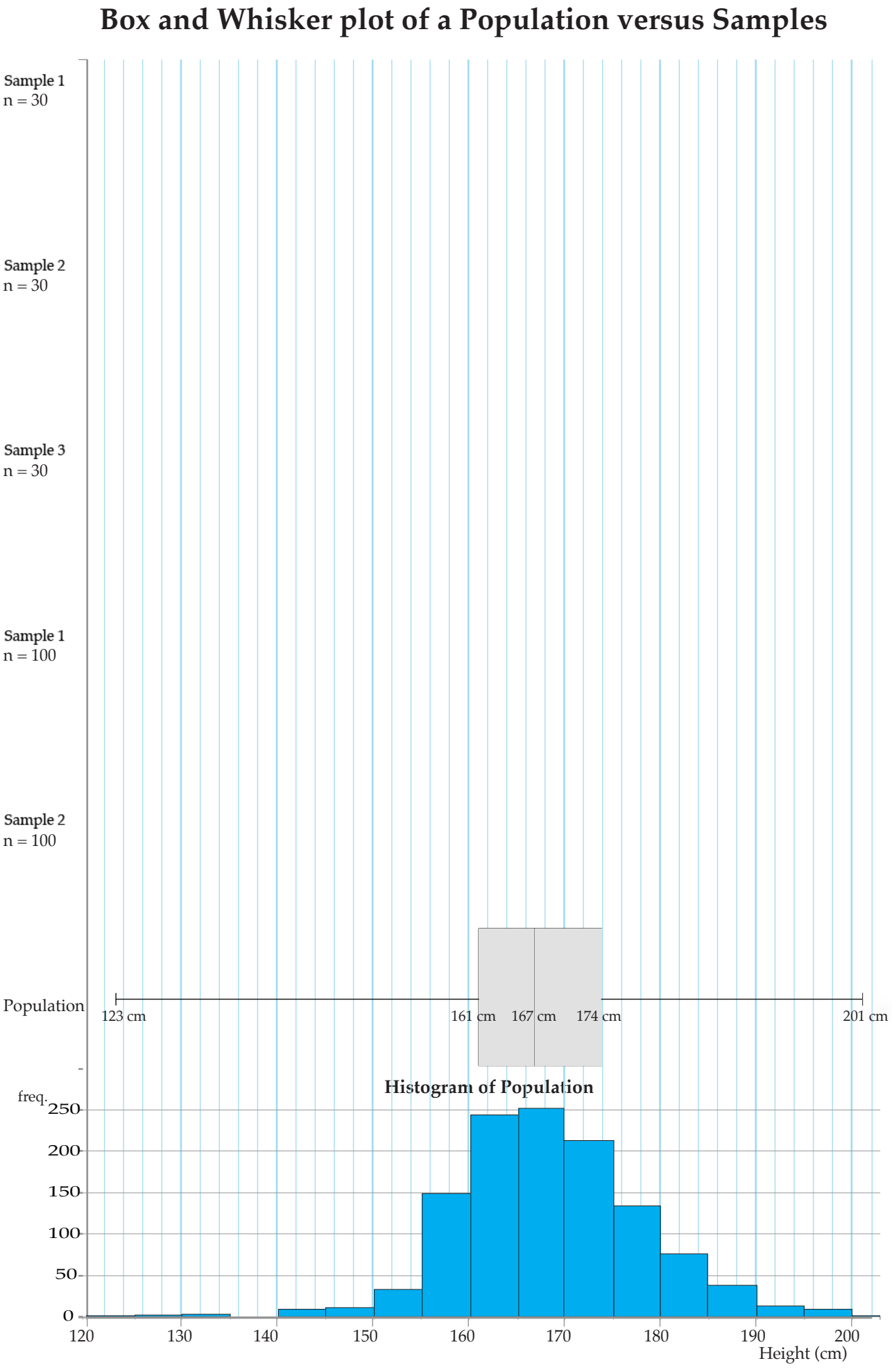
These exercises are from Page 284 of the Year 11 Mathematics Course Book and the answers are on Page 393.

From the Year 11 Mathematics Course Book, answer the questions.

137. a), b), c), d), e), f) and g)

These exercises are from Page 285 of the Year 11 Mathematics Course Book and the answers are on Page 393 & 394.

138. a), b), c), d), e), f), g) and h)


Box and Whisker plot of a Population versus Samples
Sample 1
n = 30
Sample 2
n = 30
Sample 3
n = 30
Sample 1
n = 100
Sample 2
n = 100
Population
123 cm
161 cm
167 cm
174 cm
201 cm
Histogram of Population
freq.
250
200
150
100
50
0
120
130
140
150
160
170
180
190
200
Height (cm)

These exercises are from Page 285 of the Year 11 Mathematics Course Book and the answers are on Page 394.

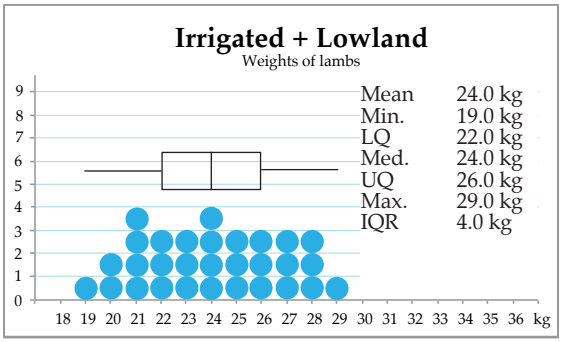
139. a), b), c), d), e), f) and g)

These exercises are from Page 289 of the Year 11 Mathematics Course Book and the answers are on Page 394 & 395.

From the Year 11 Mathematics Course Book, answer the questions.

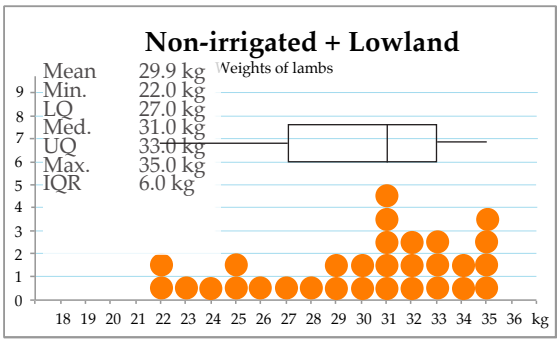
140. a), b) and c)

Irrigated + Hill		
26	28	26
27	27	23
30	28	30
26	29	24
23	28	25
31	28	24
25	23	30
28	29	29
24	25	30
23	31	25



141. a), b) and c)

Non-irrig. + Hill		
18	34	34
18	32	19
27	18	32
32	19	30
24	32	28
35	35	27
35	31	34
18	33	25
32	23	35
29	21	19



These exercises are from Page 290 of the Year 11 Mathematics Course Book and the answers are on Page 395.

From the Year 11 Mathematics Course Book, answer the questions.

142.

143.

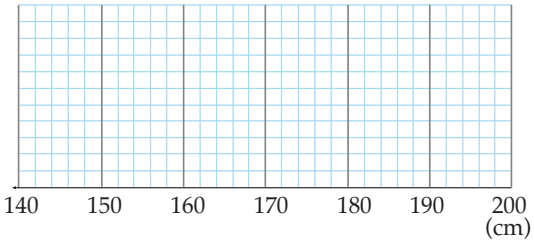
144.

These exercises are from Page 294 of the Year 11 Mathematics Course Book and the answers are on Page 395 & 396.

From the Year 11 Mathematics Course Book, justify whether the samples are sufficient for us to conclude that there is a difference in the populations.

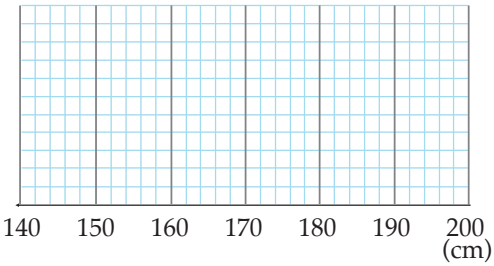
145. a) and b)

	Year 10	Year 11
Number	29	30
Minimum	158 cm	159 cm
Lower quartile	165 cm	169 cm
Median	171 cm	176 cm
Upper quartile	177 cm	182 cm
Maximum	185 cm	195 cm



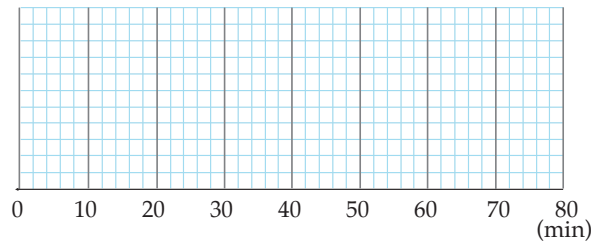
146. a) and b)

	Left handed + ambidextrous	Right handed
Number	34	200
Minimum	140 cm	145 cm
Lower quartile	169 cm	170 cm
Median	177 cm	176 cm
Upper quartile	183 cm	181 cm
Maximum	200 cm	197 cm



147. a) and b)

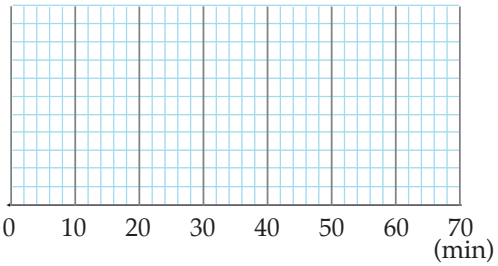
	NZ	SA
Number	41	31
Minimum	5 min	5 min
Lower quartile	10 min	10 min
Median	15 min	20 min
Upper quartile	25 min	30 min
Maximum	75 min	50 min



These exercises are from Page 294 of the Year 11 Mathematics Course Book and the answers are on Page 396.

148. a) and b)

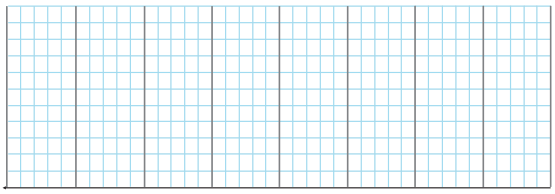
	Auck.	S. Island
Number	39	41
Minimum	1 min	6 min
Lower quartile	10 min	15 min
Median	10 min	20 min
Upper quartile	20 min	30 min
Maximum	70 min	50 min



These exercises are from Page 295 of the Year 11 Mathematics Course Book and the answers are on Page 396.

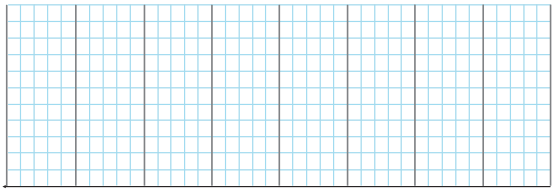
149. a) and b)

	Year 9	Year 12
Number		
Minimum	sec	sec
Lower quartile	sec	sec
Median	sec	sec
Upper quartile	sec	sec
Maximum	sec	sec



150. a), b) and c)

	Female	Male
Number		
Minimum	cm	cm
Lower quartile	cm	cm
Median	cm	cm
Upper quartile	cm	cm
Maximum	cm	cm



These exercises are from Page 298 of the Year 11 Mathematics Course Book and the answers are on Page 396 & 397.

From the Year 11 Mathematics Course Book, answer the questions.

151. a), b), c), d), e), f) and g)

152. a), b), c), d), e), f) and g)

These exercises are from Page 299 of the Year 11 Mathematics Course Book and the answers are on Page 397 & 398.

153. a), b), c), d), e), f) and g)

These exercises are from Page 299 of the Year 11 Mathematics Course Book and the answers are on Page 398.

154. a), b), c), d), e), f) and g)

These exercises are from Page 302 of the Year 11 Mathematics Course Book and the answers are on Page 398.

From the Year 11 Mathematics Course Book, answer the questions.

155. a), b), c), d), e), f) and g)

These exercises are from Page 303 of the Year 11 Mathematics Course Book and the answers are on Page 398 & 399.

156. a), b), c), d), e) and f)

These exercises are from Page 304 of the Year 11 Mathematics Course Book and the answers are on Page 399.

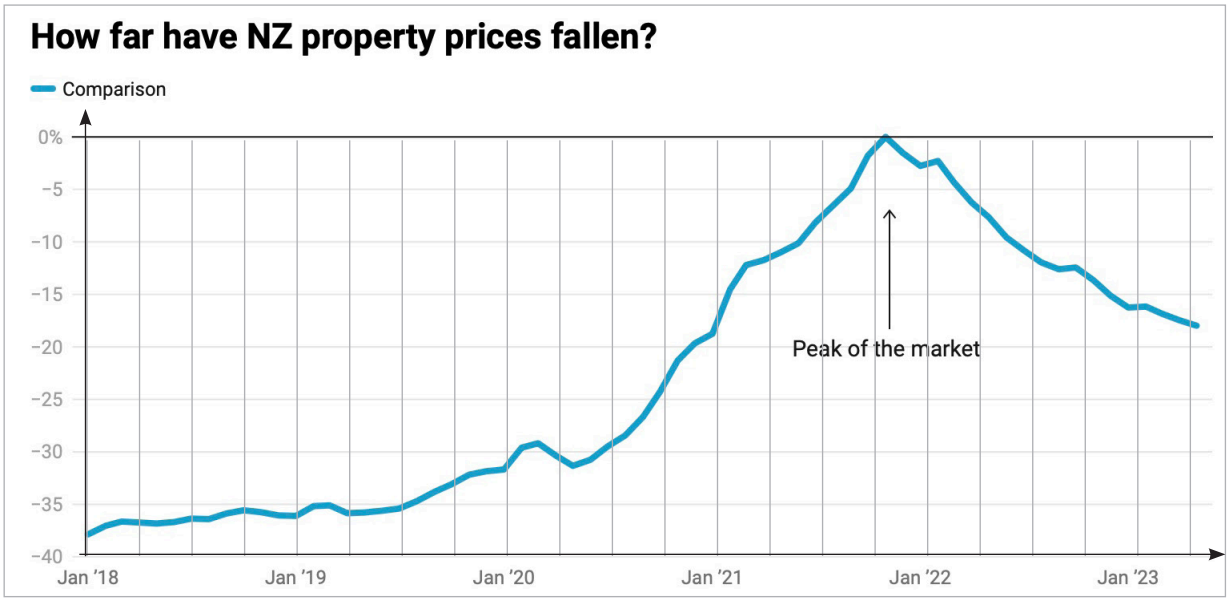
157. a), b), c), d), e) and f)

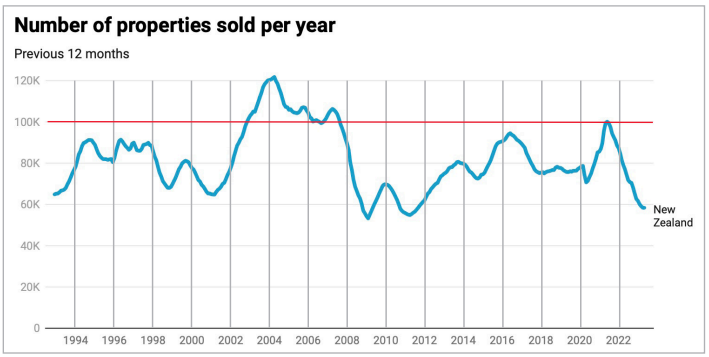
These exercises are from Page 305 of the Year 11 Mathematics Course Book and the answers are on Page 399.

158. a), b), c), d), e) and f)

These exercises are from Page 306 of the Year 11 Mathematics Course Book and the answers are on Page 399.

159. a), b), c), d), e), f) and g)





Chapter 6 Probability

- calculate probabilities and use them to make predictions
- problems can involve theoretical/experimental probabilities, probabilities from tables, informal methods of applying the multiplication principle, conditional probability, expected values, tree diagrams, lists, 2-way tables, applications of probability enquiry and risk
- evaluate mathematical and statistical information, solutions, outcomes and approached from a range of perspectives
- collect, explore, analyse and form conclusions with measured quantities and data.

This topic may contribute to assessment of:

AS1.1 (91944) Explore data using a statistical enquiry process (Internal – 5 credits)

and build knowledge for

AS1.3 (91946) Interpret and apply mathematical and statistical information in context (External – 5 credits)

These exercises are from Page 309 of the Year 11 Mathematics Course Book and the answers are on Page 400.

From the Year 11 Mathematics Course Book, calculate the probabilities.

1. a), b) and c)

2. a), b) and c)

3. a), b) and c)

4. a), b) and c)

5. a), b) and c)

6. a), b) and c)

7. a), b) and c)

These exercises are from Page 310 of the Year 11 Mathematics Course Book and the answers are on Page 400.

8. a), b), c), d), e) and f)

Red die \ White die	1	2	3	4	5	6
1	1,1	1,2	1,3	1,4	1,5	1,6
2	2,1	2,2	2,3	2,4	2,5	2,6
3	3,1	3,2	3,3	3,4	3,5	3,6
4	4,1	4,2	4,3	4,4	4,5	4,6
5	5,1	5,2	5,3	5,4	5,5	5,6
6	6,1	6,2	6,3	6,4	6,5	6,6

9. a), b) and c)

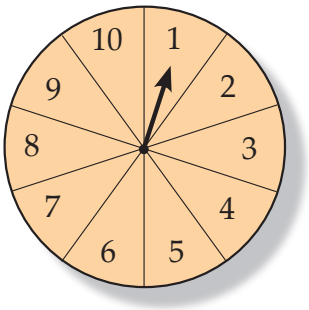
10. a), b) and c)

11. a), b), c), d), e) and f)

These exercises are from Page 312 of the Year 11 Mathematics Course Book and the answers are on Page 400.

From the Year 11 Mathematics Course Book, use probability concepts to calculate and justify statements and findings.

12. a), b), c) and d)



13. a), b), c) and d)

	Aust.	Jpn.	Eng.	Fr.	USA	Other	Total
≤ 20	9	16	3	2	6	21	57
21 – 39	25	18	10	4	12	57	126
≥ 40	47	35	24	9	15	68	198
Total	81	69	37	15	33	146	381

14. a) and b)

15. a), b) and c)

16. a), b), c), d) and e)

	A	B	C	1	2	3
A		AB				
B	BA					
C						
1						
2						
3						

These exercises are from Page 313 of the Year 11 Mathematics Course Book and the answers are on Page 400.

17. a), b), c), d) and e)

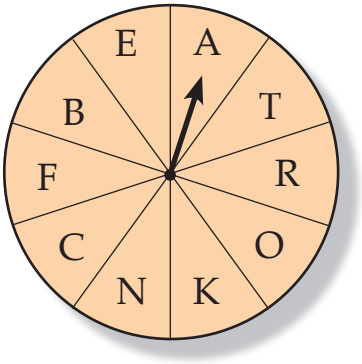
Red \ Blue	1	2	3	4	5	6
1	1	2				
2	2	4				
3						
4						
5						
6						

These exercises are from Page 314 of the Year 11 Mathematics Course Book and the answers are on Page 401.

From the Year 11 Mathematics Course Book, calculate the probabilities.

18. a), b), c) and d)

19. a), b), c) and d)



20. a), b) and c)

21. a) and b)

These exercises are from Page 314 of the Year 11 Mathematics Course Book and the answers are on Page 401.

22.

23.

24.

25.

These exercises are from Page 315 of the Year 11 Mathematics Course Book and the answers are on Page 401.

26. a), b) and c)

These exercises are from Page 317 of the Year 11 Mathematics Course Book and the answers are on Page 401.

From the Year 11 Mathematics Course Book, calculate.

27. a), b), c), d) and e)

Ball colour	Red	Yellow	Blue	White	Green
Number seen	17	3	24	0	10

28. a), b), c), d) and e)

29. a), b), c) and d)

These exercises are from Page 318 of the Year 11 Mathematics Course Book and the answers are on Page 401.

30. a), b), c) and d)

Whanganui	Pakeha	Mäori	Pacific	Asian	Totals
Male smokers	2 493	1 005	96	63	3 657
Female smokers	2 697	1 476	69	33	4 275
Total smokers	5 190	2 481	165	96	7 932
Total pop.	34 413	9 078	987	981	45 459

These exercises are from Page 318 of the Year 11 Mathematics Course Book and the answers are on Page 401.

31. a), b), c) and d)

32. a) and b)

How often	Number
Daily	872
Weekly	512
Monthly or less	490
Experimented	5 383
Never Smoked	23 864
Sample total (N)	31 121

33. a), b) and c)

Homework time	Under 30 min.	About 1 hour	About 2 hours
Boys	4	2	11
Girls	5	3	15

34. a), b), c), d), e), f), g), h) and i)

Transport	Walk	Bike	Car	Bus
Y9	164 (12)	35 (3)	62 (4)	43 (0)
Y10	182 (16)	28 (4)	32 (6)	54 (0)

These exercises are from Page 319 of the Year 11 Mathematics Course Book and the answers are on Page 401.

35. a), b), c) and d)

Number	1	2	3	4	5	6
Frequency	0	2	4	5	3	11

These exercises are from Page 319 of the Year 11 Mathematics Course Book and the answers are on Page 401 & 402.

36. a), b), c), d), e) and f)

Sport	Rugby	Netball	Football	Hockey	Basketball	Other or none
Female	16	36	11	11	12	29
Male	42	4	17	8	14	25

37. a), b), c), d), e) f) and g)

	Sport	Animation	Films	Drama	Documentary	None or no response
Male	24	16	8	2	6	29
Female	7	21	27	3	8	35

38. a), b), c) and d)

These exercises are from Page 320 of the Year 11 Mathematics Course Book and the answers are on Page 402.

39. a), b), c) and d)

Interruptions	Late to class	School notices	Students called from class	Staff entering classroom
Morning	16	4	7	3
Afternoon	8	8	3	1

40. a), b), c), d), e) and f)

Year	1999	2004	2009
Daily*	4 529	3 128	1 443
Weekly*	1 945	1 277	696
Monthly*	1 829	1 213	670
Regular (=*)	8 303	5 618	2 809
Less than Monthly	4 152	2 458	1 340
Experimented	7 403	8 842	5 127
Never Smoked	9 174	15 003	16 488
Sample total (N)	29 032	31 921	25 764

These exercises are from Page 321 of the Year 11 Mathematics Course Book and the answers are on Page 402.

From the Year 11 Mathematics Course Book, answer the questions.

41. a), b), c), d) and e)

	Satisfied	Dissatisfied	Total
Chemical Eng.	48	12	60
Civil Eng.	125	30	155
Electronic Eng.	57	18	75
TOTAL	230	60	290

42. a), b), c), d), e) and f)

	High Calorific Value	Low Calorific Value	Total
High Fibre	15	3	18
Medium Fibre	24	10	34
Low Fibre	8	15	23
TOTAL	47	28	75

43. a), b) and c)

	Claims			
	Nil	1 – 2	3+	Total
Under 25	175	64	17	256
25 and over	520	112	21	653
Total	695	176	38	909

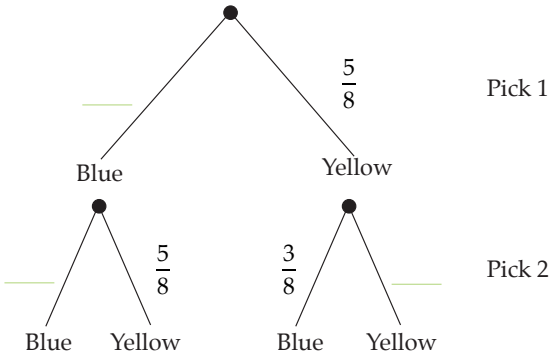
These exercises are from Page 321 of the Year 11 Mathematics Course Book and the answers are on Page 402 & 403.

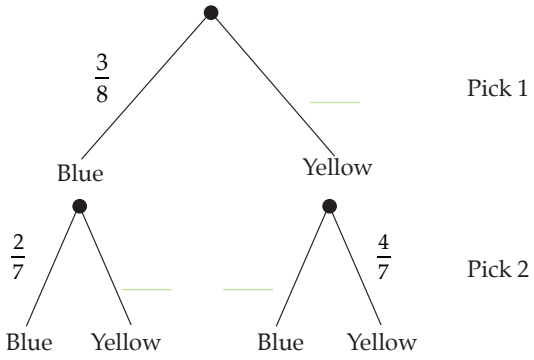
44. a), b), c), d) and e)

	Nil	Light	Heavy
Other causes	31	10	7
Cancer / heart disease	9	15	28

These exercises are from Page 323 of the Year 11 Mathematics Course Book and the answers are on Page 403.

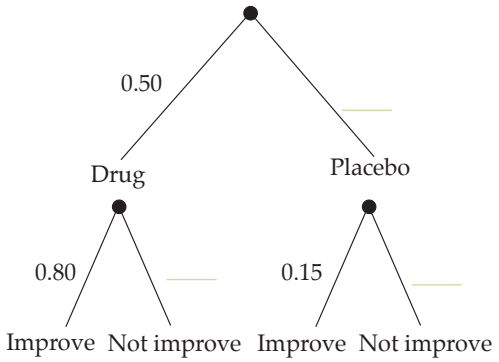
45. a), b), c), d), e) and f)



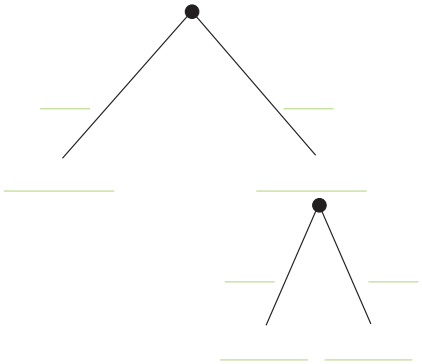


These exercises are from Page 323 of the Year 11 Mathematics Course Book and the answers are on Page 403.

46. a), b) and c)

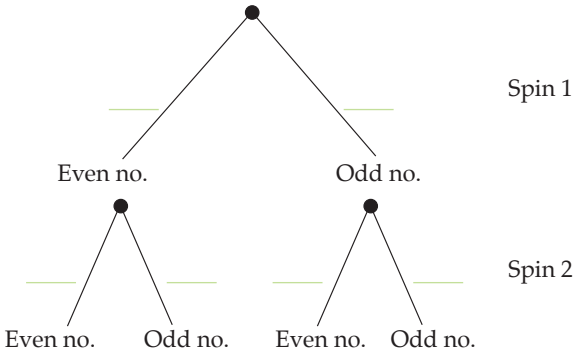


47. a), b) and c)



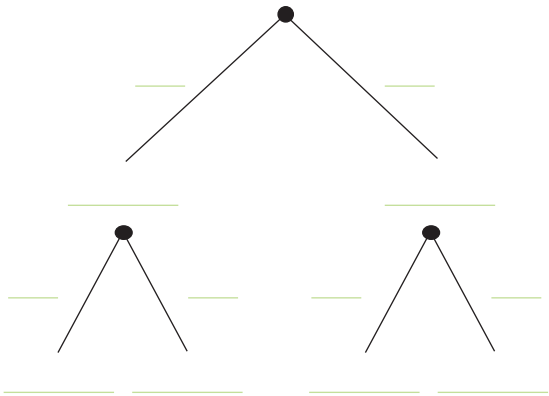
These exercises are from Page 324 of the Year 11 Mathematics Course Book and the answers are on Page 403.

48. a), b), c) and d)

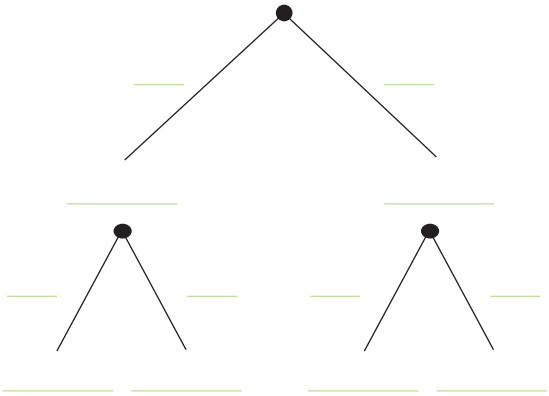


These exercises are from Page 324 of the Year 11 Mathematics Course Book and the answers are on Page 403.

49. a), b), c) and d)

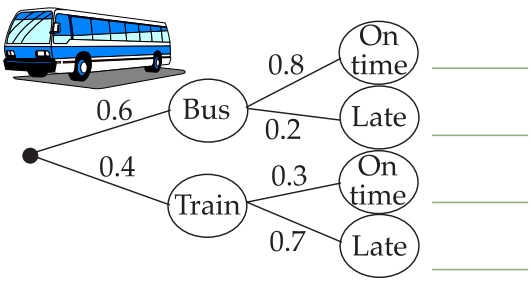


50. a), b), c) and d)



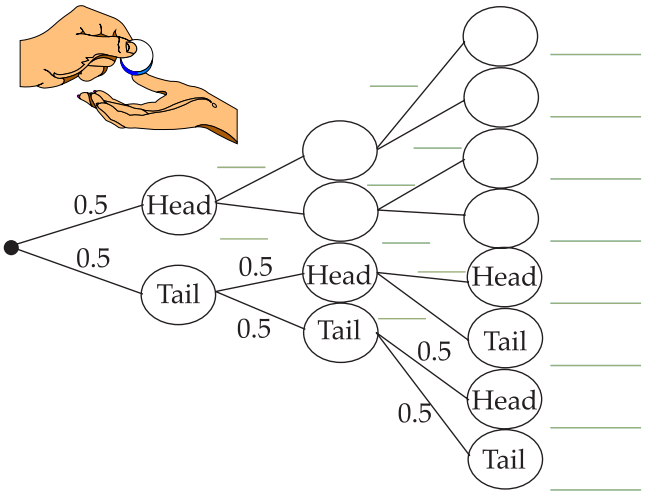
These exercises are from Page 325 of the Year 11 Mathematics Course Book and the answers are on Page 403.

51. a), b), c) and d)

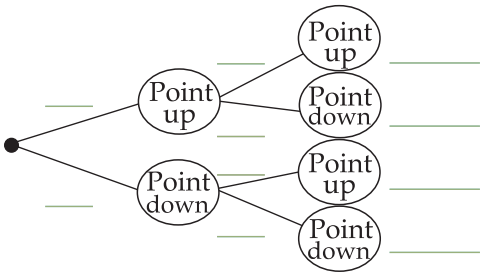


These exercises are from Page 325 of the Year 11 Mathematics Course Book and the answers are on Page 403 & 404.

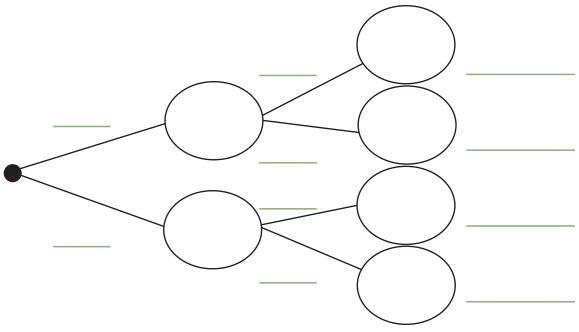
52. a), b), c) and d)



53. a), b), c), d), e) and f)

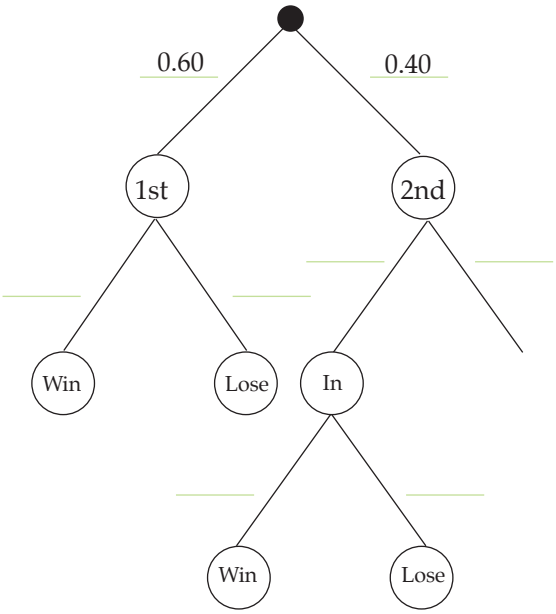


54. a), b), c) and d)

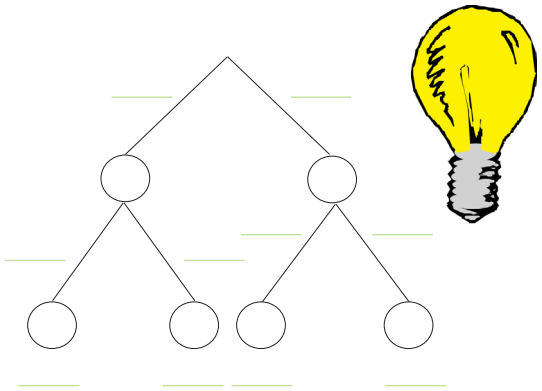


These exercises are from Page 326 of the Year 11 Mathematics Course Book and the answers are on Page 404.

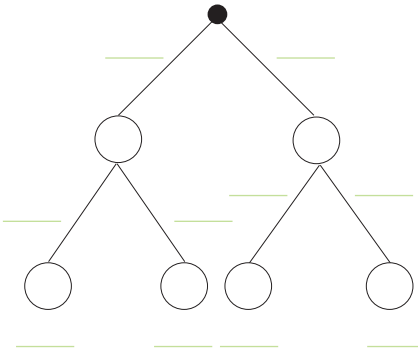
55. a), b), c), d) and e)



56. a), b), c) and d)

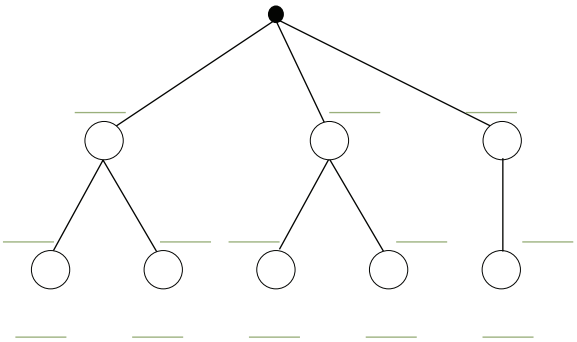


57. a), b), c), d) and e)

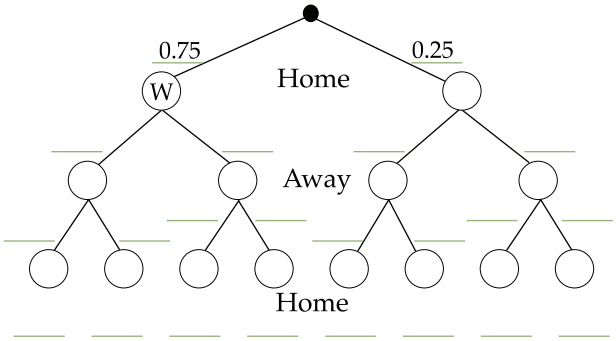


These exercises are from Page 327 of the Year 11 Mathematics Course Book and the answers are on Page 404.

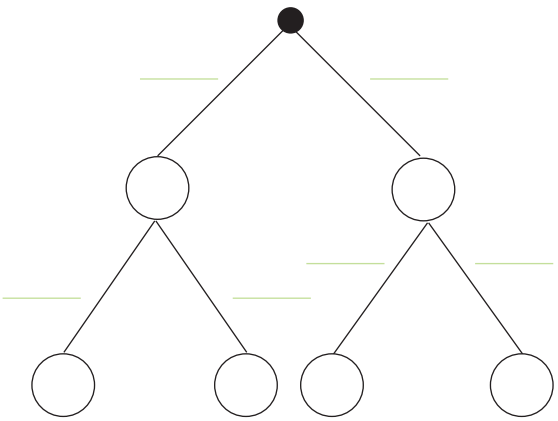
58. a), b), c) and d)



59. a), b), c) and d)

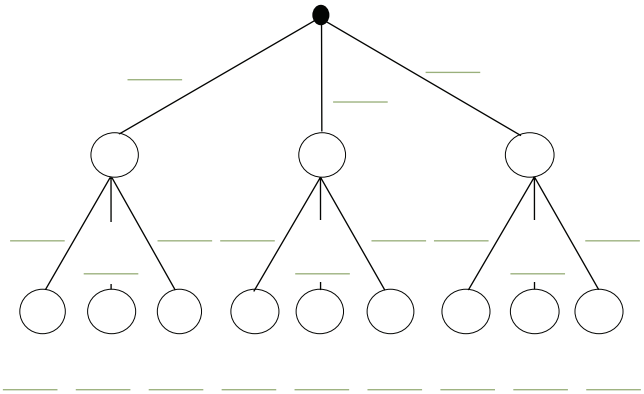


60. a), b), c) and d)



These exercises are from Page 327 of the Year 11 Mathematics Course Book and the answers are on Page 404.

61. a), b) and c)



These exercises are from Page 329 of the Year 11 Mathematics Course Book and the answers are on Page 405.

From the Year 11 Mathematics Course Book, answer the questions.

62. a), b), c), d) and e)

	Male	Female
Coffee Drinker	30	35
Non-coffee Drinker	25	10

63. a), b), c), d) and e)

	Age ≤ 40	Age > 40
Glasses for reading	41	52
No glasses for reading	14	13

These exercises are from Page 330 of the Year 11 Mathematics Course Book and the answers are on Page 405.

64. a), b), c), d) and e)

	Symptoms improved	No improvement
Medication	58	17
Placebo	12	63

65. a), b), c), d) and e)

	Lung Disease	No Lung Disease	TOTAL
Smoking	90	60	150
No smoking	60	40	100
TOTAL	150	100	250

66. a), b), c), d) and e)

	ICU and recovered	ICU and died	TOTAL
BMI (healthy range)	281	223	504
BMI (obese range)	467	529	996
TOTAL	748	752	1500

These exercises are from Page 333 of the Year 11 Mathematics Course Book and the answers are on Page 405.

67. a), b), c), d) and e)

	Died	Survived	Total
Age < 50	180	140	320
Age ≥ 50	35	250	285
Total	215	390	605

68. a), b), c), d) and e)

	Sexual content	No sexual content	Total
Comedy	70	110	180
Drama	80	90	170
Total	150	200	350

69. a), b) and c)

Sport/activity	RR
Airsports	450
Climbing	137
Motor sports	81
Fishing	41
Horse riding	29
Swimming	7.0
Athletics	5.7
Football	4.9
Tennis	4.2
Cycling	1.0
Golf	0.83
Walking	0.06

These exercises are from Page 333 of the Year 11 Mathematics Course Book and the answers are on Page 406.

70. a), b), c), d), e) and f)

	Obese	Not Obese	Total
Diabetes	300	60	360
No Diabetes	130	510	640
Total	430	570	1000

These exercises are from Page 334 of the Year 11 Mathematics Course Book and the answers are on Page 406.

71.

	Liver disease	Not liver disease
Alcohol drinker	0.18	0.82
Non-alcohol drinker	0.02	0.98

72. a), i) and ii), b), c), d), e), f), g), h), i) and j)

	Placebo	Drug	Total
Asthma attack	180	126	306
No attack	45	84	129
Total	225	210	435

These exercises are from Page 334 of the Year 11 Mathematics Course Book and the answers are on Page 406.

73. a), b), c), d) and e)

			Total
Total			

74. a), b), c), d) and e)

			Total
Total			

75. a), b), c) and d)

			Total
Total			