

Topic 1

Number

Page 2

1. $\frac{2}{3}$

2. $\frac{5}{8}$

3. $\frac{2}{3}$

4. $\frac{3}{4}$

5. $\frac{3}{4}$

6. $\frac{1}{3}$

7. $\frac{5}{6}$

8. $\frac{9}{10}$

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9. $\frac{7}{6}$

10. $\frac{22}{3}$

11. $\frac{17}{6}$

12. $\frac{17}{5}$

13. $\frac{29}{3}$

14. $\frac{31}{4}$

15. $\frac{23}{2}$

16. $\frac{53}{5}$

17. $5\frac{2}{3}$

18. $2\frac{3}{4}$

19. $2\frac{1}{3}$

20. $7\frac{1}{3}$

21. 3

22. $4\frac{3}{4}$

23. $2\frac{1}{2}\left(2\frac{3}{6}\right)$

24. $4\frac{1}{5}$

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25. $\frac{3}{4}$

26. $\frac{1}{2}$

27. 1

28. $\frac{1}{2}$

29. $\frac{7}{12}$

30. $\frac{13}{15}$

31. $\frac{5}{24}$

32. $\frac{3}{10}$

33. $\frac{7}{8}$

34. $3\frac{1}{12}$

35. $4\frac{1}{4}$

36. $4\frac{37}{72}$

37. $2\frac{1}{3}$

38. $2\frac{9}{20}$

39. $\frac{2}{5}$

40. $10\frac{5}{8}$

41. $\frac{7}{8} - \frac{2}{8} = \frac{5}{8}$

42. $\frac{5}{6} + \frac{4}{6}$

$= \frac{9}{6}$

$= 1\frac{1}{2}$

43. $\frac{12}{20} + \frac{5}{20} = \frac{17}{20}$

44. $\frac{18}{20} - \frac{15}{20} = \frac{3}{20}$

45. $\frac{14}{4} - \frac{11}{4} = \frac{3}{4}$

46. $\frac{63}{12} - \frac{32}{12} = \frac{31}{12}$

$= 2\frac{7}{12}$

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47. $4\frac{7}{12}$ hours

48. $1\frac{1}{2}$

49. $4\frac{11}{12}$ cups

50. $\frac{5}{6}$ tonne

51. $3\frac{1}{12}$ hours

52. $1\frac{7}{12}$

53. $\frac{5}{6}$ hour (50 min.)

54. $6\frac{13}{20}$ packets

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55. $5\frac{1}{2}$

56. $2\frac{1}{4}$

57. $2\frac{1}{4}$

58. $5\frac{1}{4}$

59. $\frac{3}{20}$

60. $\frac{8}{15}$

61. $1\frac{1}{2}$

62. $\frac{15}{15} = 1$

63. $\frac{15}{2} = 7\frac{1}{2}$

64. $\frac{63}{64}$

65. $\frac{6}{5} = 1\frac{1}{5}$

66. $\frac{125}{64} = 1\frac{61}{64}$

67. $\frac{16}{3} = 5\frac{1}{3}$

68. $\frac{1}{10}$

69. $\frac{90}{15} = 6$

70. $\frac{15}{8} = 1\frac{7}{8}$

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71. $\frac{32}{1} = 32$

72. $\frac{1}{32}$

73. $\frac{46}{3} = 15\frac{1}{3}$

74. $\frac{36}{36} = 1$

75. $\frac{35}{18} = 1\frac{17}{18}$

76. $\frac{72}{24} = 3$

77. $\frac{20}{21}$

78. $\frac{2}{3}$

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79. $8\frac{1}{3}$ cups of flour

$11\frac{1}{4}$ tbsp. of butter

$3\frac{3}{4}$ cups of milk

$\frac{5}{8}$ tsp. of salt

80. a) $\frac{3}{4}$ kg of puha

$7\frac{1}{2}$ potatoes etc.

$2\frac{1}{4}$ kg of brisket

b) $\frac{9}{40}$ so use a $\frac{1}{4}$

81. $1\frac{1}{6}$ tonnes of sand

$\frac{7}{12}$ tonne of cement

$1\frac{3}{4}$ tonnes of gravel

82. 100 m gives 30 chords and

$\frac{10}{13}$ of a chord left.

200 m gives 61 chords and

$\frac{7}{13}$ of a chord left.

400 m gives 123 chords and

$\frac{1}{13}$ of a chord left which is

the least wastage.

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83. $1 - \left(\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16}\right)$

$= \frac{1}{16}$

84. a) 14 m^2

b) $10\frac{1}{2} \text{ m}^2$

c) $\frac{21}{35} = \frac{3}{5}$ of a can.

85. a) $\frac{3}{8}$ of a cylinder.

b) $26\frac{2}{3}$ days.

86. a) Pgm. $2\frac{5}{8}$ h, advt. $\frac{7}{8}$ h

b) Pgm. $\frac{3}{8}$ h, advt. $\frac{1}{8}$ h

c) $2\frac{1}{2} \div \frac{3}{4} = 3\frac{1}{3}$ h

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87. 0.8

88. 0.625

89. 0.35

90. 0.275

91. 3.6

92. 9.8

93. 2.225

94. 11.125

95. $\frac{3}{4}$

96. $\frac{9}{20}$

97. $\frac{7}{10}$

98. $\frac{11}{20}$

99. $\frac{1}{8}$

100. $3\frac{13}{20}$

101. $\frac{1}{16}$

102. $5\frac{1}{20}$

103. 0.4167 (4 dp)

104. 0.2222 (4 dp)

105. 3.6667 (4 dp)

106. 5.5714 (4 dp)

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107. 0.75 and 0.7778, $\frac{7}{9}$ is larger.

108. 3.6 and 3.55, $3\frac{3}{5}$ is larger.

109. 0.775 and 0.8, $\frac{4}{5}$ is larger.

110. 0.3333 and 0.35, $\frac{7}{20}$ is larger.

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111. $\frac{3}{4}$

112. $\frac{4}{5}$

113. $\frac{1}{10}$

114. $\frac{9}{20}$

115. $\frac{1}{25}$

116. $1\frac{1}{5} \left(\frac{6}{5}\right)$

117. $\frac{7}{8}$

118. $\frac{1}{8}$

119. $\frac{1}{3}$

120. $\frac{3}{8}$

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121. 60%

122. 87.5% $\left(87\frac{1}{2}\%\right)$

123. 21.3% $\left(21\frac{1}{3}\%\right)$

124. 21.9% $\left(21\frac{7}{8}\%\right)$

125. 16.7% $\left(16\frac{2}{3}\%\right)$

126. 71.4% $\left(71\frac{3}{7}\%\right)$

127. 3.3% $\left(3\frac{1}{3}\%\right)$

128. 13.3% $\left(13\frac{1}{3}\%\right)$

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- 129. Home 55.5% and away 54.5%. Answer **Home**.
- 130. Brand A 31.7% and Brand B 34%. **Brand B**
- 131. Cola 11.0% and energy 10.8%. Answer **Cola**.
- 132. Year 11, 14.2% and Year 12, 13.3%. **Year 11**.
- 133. HS 15.3%, GC 18.6% and TM 10.1%. **Simple toasted**.
- 134. OO 18.2%, RB 28.8% and CO 1.5%. **Canola oil**.

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- 135. 96 litres.
- 136. 136 lessons.
- 137. $3\% = 18 \text{ ml}$, $0.5\% = 3 \text{ ml}$ so answer is 15 ml.
- 138. 16.8 minutes.
- 139. 11.6, 11 or 12 students.
- 140. \$9.38
- 141. 13 204 students.
- 142. \$11.10
- 143. 166
- 144. \$546.75

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- 145. 954 220
- 146. \$926.89
- 147. \$11 773.63
- 148. \$1399.42
- 149. \$191.37
- 150. \$12 909.23

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- 151. 2 354 839
- 152. \$3845.59
- 153. \$190, paid \$156.75
- 154. 762 304
- 155. Previous \$5.83, Latest \$7.03
- 156. 1 419 000, not voluntary 1 035 870

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- 157. 1060
- 158. \$45 total so \$15 per hour.
- 159. 254 000 litres
- 160. Tax 89.5%, \$86.75 and tax \$9.11
- 161. \$3.65
- 162. \$935.48, now \$993.48

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- 163. \$569.25
- 164. 253
- 165. \$2.37 / litre
- 166. 1 424 000
- 167. \$169.15
- 168. \$1924
- 169. 2 973 600 tourists
- 170. 62 485 births
- 171. \$402 500
- 172. \$15 400

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- 173. \$14.04
- 174. \$163.84
- 175. Price \$249.60
- 176. 60.0%
- 177. Original \$100, up 50% = \$150. Now 50% off reduces this to \$75, a 25% reduction on the original price.

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- 178. Increased by 3.0%
- 179. Reduced by 33.9%
- 180. Reduced by 12.1%
- 181. Increased by 27.2%
- 182. Reduced by 44.6%
- 183. Increased by 246.7%
- 184. Increased by 10.0%
- 185. Reduced by 12.0%
- 186. Increased by 82.1%, youth rate increased by 141.8%.
- 187. Increased by 983.3%

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- 188. Retail price \$215.63, GST \$28.13
- 189. Retail price \$407.10
- 190. Retail price \$30.48, total GST \$218.63
- 191. Markup \$0.67 or 67¢.
- 192. Retail price \$7.65 per 250 ml, total GST \$698.25
- 193. Retail price \$3622.50, GST \$472.50
- 194. Retail price \$29.57, GST \$3.86
- 195. Total \$1840 for 500 bags, \$3.68 / 20 sweets.
- 196. Retail price \$3.50, GST \$0.46.

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- 197. Price (ex GST) \$216.96, GST \$32.54
- 198. Price (ex GST) \$11 095.65
- 199. Price (ex GST) \$3.26, GST \$0.49
- 200. Price two vans (ex GST) \$26 957, GST \$4043
- 201. Price (ex GST) \$5086.96, GST \$763.04
- 202. Price (ex GST) \$8.26, Number is 121 for 1000 drives.

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- 203. $9 \div 3 = 3$
- 204. $20 + 20 = 40$
- 205. $27 - 24 = 3$
- 206. $3 \times 9 - 20 = 27 - 20 = 7$
- 207. $21 - 4(5) = 21 - 20 = 1$
- 208. $1 \times 12 = 12$
- 209. $6 + 2(5 + 4) = 6 + 2(9) = 6 + 18 = 24$
- 210. $4 + 18 - 4 = 22 - 4 = 18$
- 211. $8 \div 2 + 3^2 = 8 \div 2 + 9 = 4 + 9 = 13$
- 212. $4(5) + 3 \times 3 - 3 = 20 + 9 - 3 = 29 - 3 = 26$
- 213. 19
- 214. 33
- 215. 15
- 216. 1
- 217. 12
- 218. 10
- 219. 90
- 220. 65
- 221. 60
- 222. 194
- 223. 44
- 224. 102

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(other answers are possible)

225. $2 = 9 \div 9 + 9 \div 9$
 226. $3 = 9 \div \sqrt{9} + 9 - 9$
 227. $4 = 9 \div \sqrt{9} + 9 \div 9$
 228. $5 = 9 - \sqrt{9} - 9 \div 9$
 229. $6 = 9 \div \sqrt{9} + 9 \div \sqrt{9}$
 $6 = \sqrt{9} + \sqrt{9} + 9 - 9$
 230. $7 = 9 - \sqrt{9} + 9 \div 9$
 231. $8 = \sqrt{9} \times \sqrt{9} - 9 \div 9$
 232. $9 = \sqrt{9} \times \sqrt{9} + 9 - 9$
 233. $10 = \sqrt{9} \times \sqrt{9} + 9 \div 9$
 234. $11 = 9 + \sqrt{9} - 9 \div 9$

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235. 6480
 236. 46 875
 237. 2
 238. 1125
 239. 800
 240. 9801
 241. 162
 242. 2
 243. 2.25
 244. 6000
 245. 66 550

246. 8
 247. 3
 248. 54
 249. 384
 250. $2^3 \times 3^4$
 251. $2 \times 5^4 \times 11^3$
 252. $1.5^4 \times 4^2$

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253. 16
 254. 21
 255. 1.5
 256. 3
 257. 9
 258. 2
 259. 6
 260. 8
 261. 2
 262. 1.348
 263. 1.698
 264. 2.289
 265. 1.189

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266. 5.5
 267. 4.25
 268. 12.356
 269. 1.122
 270. 0.681
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 271. 720
 272. 6
 273. 5040
 274. 3 628 800
 275. 6 227 020 800

276. 1
 277. 13
 278. 18
 279. 11
 280. 86
 281. 32
 282. 15
 283. 39
 284. 1
 285. 21

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Fun Spot

- $1 = \frac{44}{44}$
 $2 = \frac{4}{4} + \frac{4}{4}$
 $3 = 4 - \sqrt{4} + \frac{4}{4}$
 $4 = \sqrt{4} + \sqrt{4} + 4 - 4$
 $5 = \sqrt{4} + \sqrt{4} + \frac{4}{4}$
 $6 = \sqrt{4} + 4 + 4 - 4$
 $7 = \sqrt{4} + 4 + \frac{4}{4}$
 $8 = \sqrt{4} + \sqrt{4} + \sqrt{4} + \sqrt{4}$
 $9 = 4 \times \sqrt{4} + \frac{4}{4}$
 $10 = 4 + 4 + \frac{4}{\sqrt{4}}$
 $11 = \frac{4}{.4} + \frac{4}{4}$

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- $12 = 4 \times 4 - \sqrt{4} - \sqrt{4}$
 $13 = \frac{44}{4} + \sqrt{4}$
 $14 = 4 \times 4 - 4 + \sqrt{4}$
 $15 = \frac{44}{4} + 4$
 $16 = 4 \times 4 + 4 - 4$
 $17 = \frac{4! + \sqrt{4}}{\sqrt{4}} + 4$
 $18 = 4 \times 4 + 4 - \sqrt{4}$
 $19 = 4! - 4 - \frac{4}{4}$
 $20 = 4 \times 4 + \sqrt{4} + \sqrt{4}$
 $21 = 4! - 4 + \frac{4}{4}$
 $22 = 4! - \sqrt{4} + 4 - 4$
 $23 = 4! - \frac{(\sqrt{4} + \sqrt{4})}{4}$
 $24 = 4! + \sqrt{4} + \sqrt{4} - 4$
 $25 = 4! + \frac{(\sqrt{4} + \sqrt{4})}{4}$
 $26 = 4! + \sqrt{4} + 4 - 4$
 $27 = 4! + \frac{4}{4} + \sqrt{4}$
 $28 = 4! + 4 + 4 - 4$
 $29 = 4! + \frac{4}{4} + 4$
 $30 = 4! + 4 + 4 - \sqrt{4}$
 $31 = 4! + \frac{4}{.4} - \sqrt{4}$
 $32 = 4! + 4 + \sqrt{4} + \sqrt{4}$
 $33 = 4! + \frac{(\sqrt{4} + \sqrt{4})}{.4}$
 $34 = 4! + 4 + 4 + \sqrt{4}$
 $35 = 4! + \frac{4}{.4} + \sqrt{4}$

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$$36 = (\sqrt{4} + \sqrt{4} + \sqrt{4})^{\sqrt{4}}$$

$$37 = 4! + \frac{4}{.4} + 4$$

$$38 = (4 + \sqrt{4})^{\sqrt{4}} + \sqrt{4}$$

$$39 = \sqrt{4} \times 4! - \frac{4}{.4}$$

$$40 = (4 + \sqrt{4})^{\sqrt{4}} + 4$$

$$41 = 44 - \sqrt{\frac{4}{.4}}$$

$$42 = 44 - 4 + \sqrt{4}$$

$$43 = 44 - \frac{4}{4}$$

$$44 = 44 + 4 - 4$$

$$45 = 44 + \frac{4}{4}$$

$$46 = 44 + 4 - \sqrt{4}$$

$$47 = \sqrt{4} \times 4! - \frac{4}{4}$$

$$48 = 44 + \sqrt{4} + \sqrt{4}$$

$$49 = \sqrt{4} \times 4! + \frac{4}{4}$$

$$50 = 44 + 4 + \sqrt{4}$$

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286. a) 1.684×10^1
 b) 1.5798×10^2
 c) 4.17×10^2
 d) 1.25×10^4
 e) 8.245×10^0
 f) 7.5×10^8
287. a) 245.6
 b) 6.45
 c) 824 000
 d) 159.52
 e) 62.5
 f) 9 753 400

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288. 5.1681×10^{10}
 51 681 000 000
289. 3.1×10^3
 3100
290. 5.6471×10^7
 56 471 000
291. 3.15×10^2
 315
292. 6.3882×10^{13}
 63 882 000 000 000
293. 1.5×10^4
 15 000
294. 8.605×10^5
 860 500
295. 6.525×10^6
 6 525 000
296. 1.0728×10^8
 107 280 000
297. $3.182 64 \times 10^6$
 3 182 640
298. $\$7.021 721 \times 10^4$
 \\$70 217.21
299. 2.75×10^7
 27 500 000
- Page 45
300. a) 5.67×10^{-2}
 b) 4.59×10^{-1}
 c) 5.677×10^{-4}
 d) 4.785×10^{-3}
301. a) 0.605
 b) 0.0025
 c) 0.000 455
 d) 0.000 025 95
302. 1.6121×10^3
 1612.1
303. 6.8×10^{-6}
 0.000 006 8
304. 2.575×10^0
 2.575
305. 9.4×10^{-5}
 0.000 094
306. 7.5×10^{-7}
 0.000 000 75
307. 1.7108×10^{-2}
 0.017 108

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308. 2.99×10^{-23} g
 309. 260 000 mice
 310. 9.6×10^{-5} m
 311. 2.5×10^{-4} g
 2.5×10^{-7} kg

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312. 147.247 (3 dp)
 313. 0.4568 (4 dp)
 314. 8.750 (3 dp)
 315. 11.50 (2 dp)
 316. 0.0255 (4 dp)
 317. 0.01 (2 dp)
 318. 20 (0 dp)
 319. 13 483 (0 dp)
 320. 6.50 (2 dp)

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321. 32.0 (1 dp)
 322. \$86.67 (2 dp)
 323. \$15.18 (2 dp)
 324. \$7.78 (2 dp)
 325. \$1 063.28 (2 dp)
 326. \$308.48 (2 dp)
 327. \$94.10 (2 dp)
 328. a) \$6.79 (2 dp)
 b) \$16.80 (1 dp)
 329. a) \$39.29 (2 dp)
 b) \$39.30 (1 dp)

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330. 85.7% (1 dp)
 331. 9.5% (1 dp)
 332. 42.9% (1 dp)
 333. 88.9% (1 dp)
 334. 53.6% (1 dp)
 335. 22.7% (1 dp)
 336. 70.7% (1 dp)
 337. 53.3% (1 dp)

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338. 22.1 kg (1 dp)
 339. 1.0 kg (1 dp)
 340. 113 m (0 dp)
 341. 19.3 m (1 dp)
 342. 1.0 Gb (0 dp)
 343. 715 kg (0 dp)

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344. 0.0467 (3 sf)
 345. 1.01 (3 sf)
 346. 120 (2 sf)
 347. 4 760 (3 sf)
 348. 0.000 215 (3 sf)
 349. 4 600 000 (2 sf)
 350. 86.0 (3 sf)
 351. 50 000 000 (1 sf)
 352. 0.000 03 (1 sf)
 353. 3.00 (3 sf)

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354. 11 km (2 sf)
 355. 1700 kg (2 sf)
 356. 120 m² (2 sf)
 357. 20 tonnes (2 sf)
 358. 160 m² (2 sf)
 359. 57 m³ (2 sf)

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360. A = 110 m² (2 sf)
 P = 49.0 m (1 dp)
 361. h = 14.7 m (3 sf)
 P = 46.5 m (1 dp)
 362. \$770 (2 sf)
 363. \$850 000 (2 sf)
 364. 260 tonne (2 sf)
 365. 1000 h (2 sf)

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366. 5 : 3
 367. 8 : 5
 368. 5 : 6
 369. 3 : 5
 370. 1 : 200
 371. 1 : 8
 372. 1 : 50
 373. 1 : 2 Same units!
 374. 4 : 1 Same units!
 375. 1 : 100 000 Same units!
 376. 1 : 6 Same units!
 377. 4 : 9 Same units!
 378. Barry \$54
 Dinuka \$90
 379. Max 12 h
 Alice 8 h

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380. Toby 16
 Owen 20
 Nita 24
 381. Julian \$11 666.67
 Daniel \$13 333.33
 Amaan \$15 000

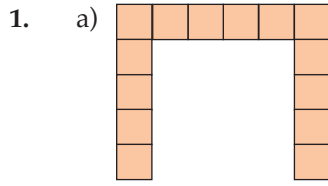
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382. a) 3 : 5
 b) Michelle \$168.75/mo
 which is \$2025 pa
 Kadee \$281.25/mo
 which is \$3375 pa
 383. a) 5 : 3
 b) Annabelle \$1875
 Pratibha \$1125
 384. a) 13 : 11
 b) Cookie \$100 208.33 pa
 Sledge \$84 791.67 pa
 385. a) 3 : 4 : 5
 b) Noah \$50
 Ben \$66.67
 Joost \$83.33

Topic 2

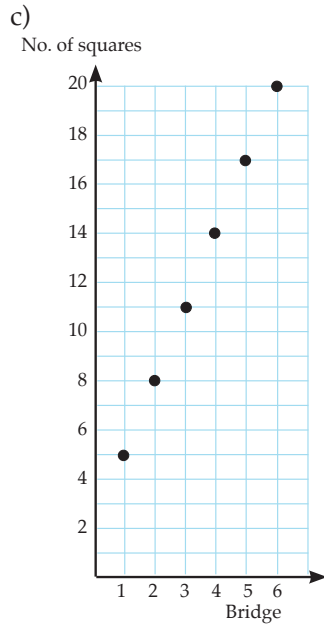
Algebra

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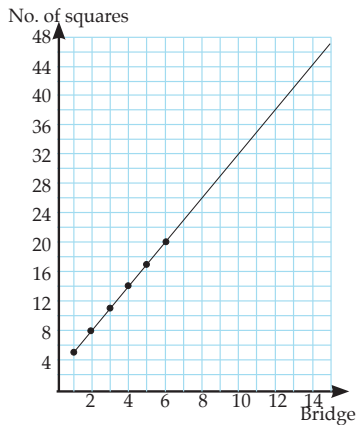


b)

Bridge	No. of squares
1	5
2	8
3	11
4	14
5	17
6	20



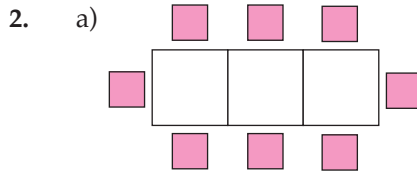
- d) C
e) 32
f)



Page 59 Q1 cont...

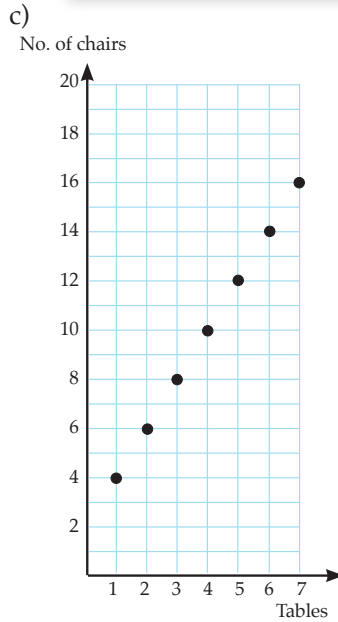
- g) 47
h) 11

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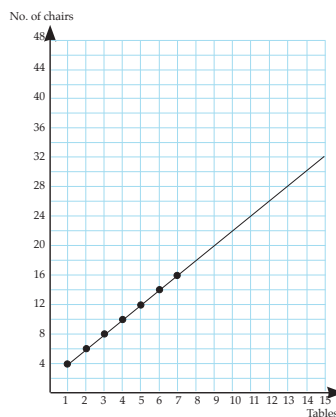


b)

Tables	No. of chairs
1	4
2	6
3	8
4	10
5	12
6	14
7	16



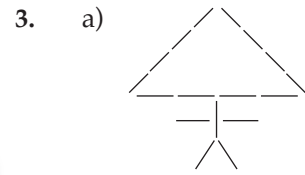
- d) D
e) 22
f)



Page 60 Q2 cont...

- g) 32
h) 13
i) 29

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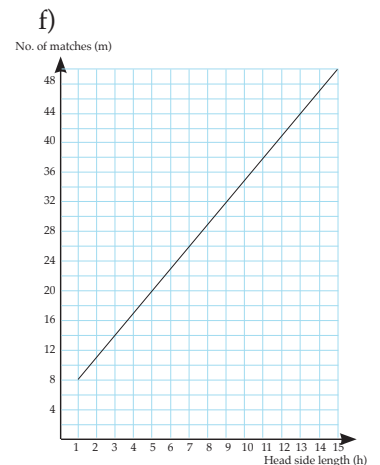
b)

Head side length (h)	No. of matches (m)
1	8
2	11
3	14
4	17
5	20
6	23

c)

Head side length (h)	No. of matches (m)	Differences
1	8	
2	11	3
3	14	3
4	17	3
5	20	3
6	23	3

- d) They are the same (3).
e) $m = 3h + 5$



- g) 35
h) 80
i) 16
j) 30

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4. Worked example.

5. $t = 4n - 1$

Sequence	Differences
3	
7	4
11	4
15	4
19	4
23	4
27	4

6. $t = 5n - 3$

Sequence	Differences
2	
7	5
12	5
17	5
22	5
27	5
32	5

7. $t = 2n + 6$

Sequence	Differences
8	
10	2
12	2
14	2
16	2
18	2
20	2

8. $t = -2n + 17$

Sequence	Differences
15	
13	-2
11	-2
9	-2
7	-2
5	-2
3	-2

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9. $t = -5n + 50$

Sequence	Differences
45	
40	-5
35	-5
30	-5
25	-5
20	-5
15	-5

10. $t = -7n + 25$

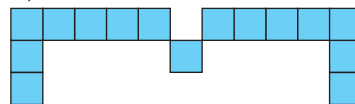
Sequence	Differences
18	
11	-7
4	-7
-3	-7
-10	-7
-17	-7
-24	-7

11. $t = -4n - 2$

Sequence	Differences
-6	
-10	-4
-14	-4
-18	-4
-22	-4
-26	-4
-30	-4

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12. a)



b)

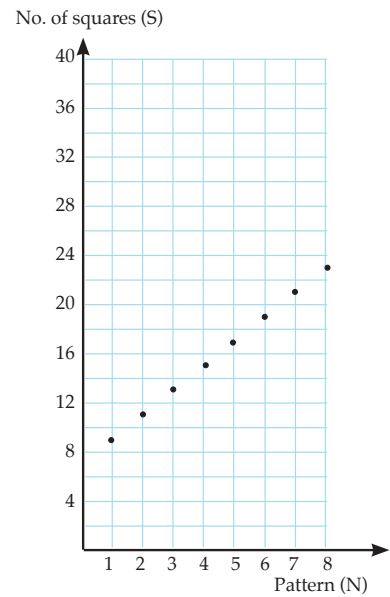
Pattern	Number of squares	Differences
1	9	
2	11	2
3	13	2
4	15	2
5	17	2
6	19	2

Page 63 Q12 cont...

c) Constant difference of 2.

d) $S = 2N + 7$

e)



f) 57

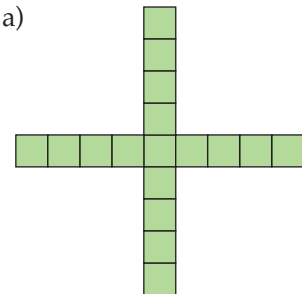
g) 137

h) 77

i) 148

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13. a)



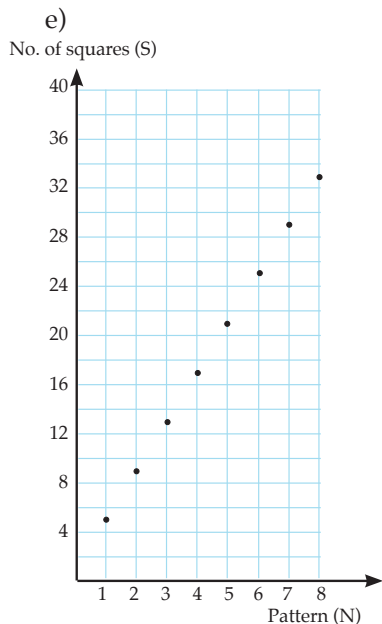
b)

Pattern	Number of squares	Differences
1	5	
2	9	4
3	13	4
4	17	4
5	21	4
6	25	4

c) Linear, because first difference is constant (4).

d) $S = 4N + 1$

Page 64 Q13 cont...

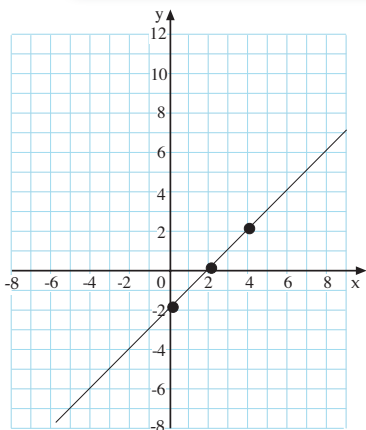


- f) 81
- g) 141
- h) 34
- i) 103

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14.

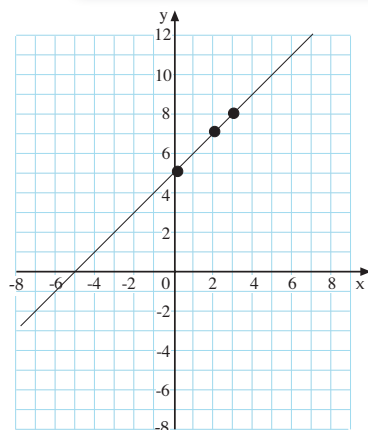
	x	y
Point 1	0	-2
Point 2	2	0
Check	4	2



Page 67 cont...

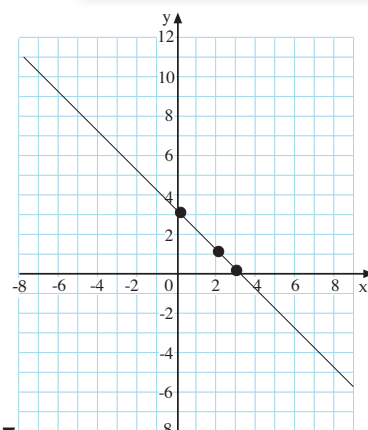
15.

	x	y
Point 1	0	5
Point 2	2	7
Check	3	8



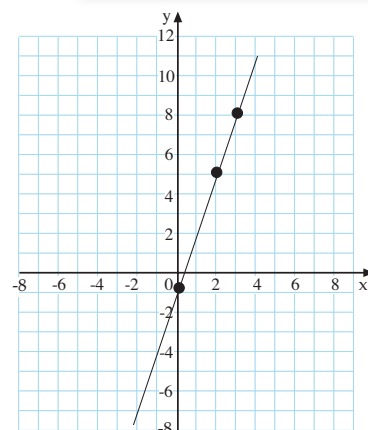
16.

	x	y
Point 1	0	3
Point 2	2	1
Check	3	0



17.

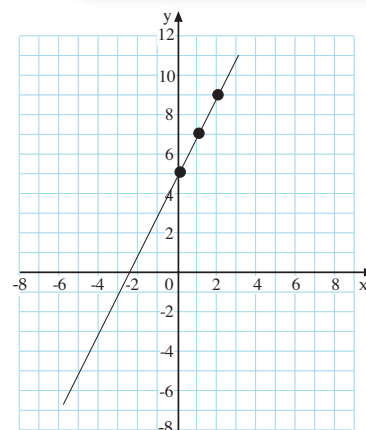
	x	y
Point 1	0	-1
Point 2	2	5
Check	3	8



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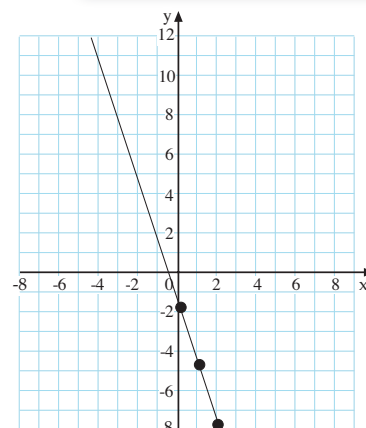
18.

	x	y
Point 1	0	5
Point 2	2	9
Check	1	7



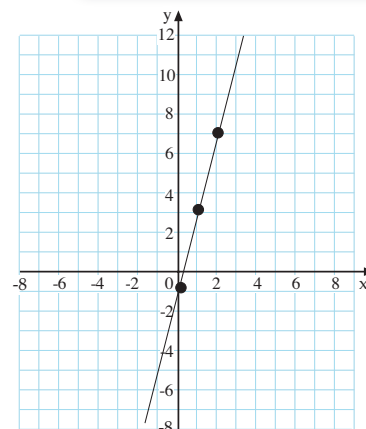
19.

	x	y
Point 1	0	-2
Point 2	2	-8
Check	1	-5



20.

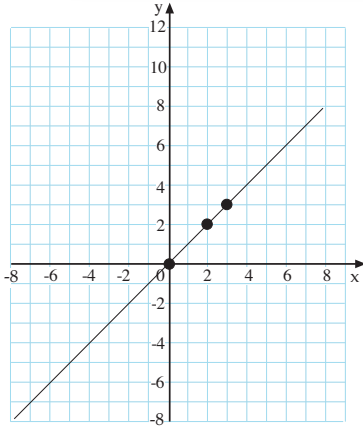
	x	y
Point 1	0	-1
Point 2	2	7
Check	1	3



Page 68 cont...

21.

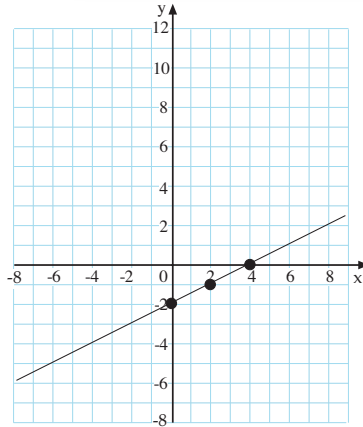
	x	y
Point 1	0	0
Point 2	2	2
Check	3	3



Page 69 cont...

24.

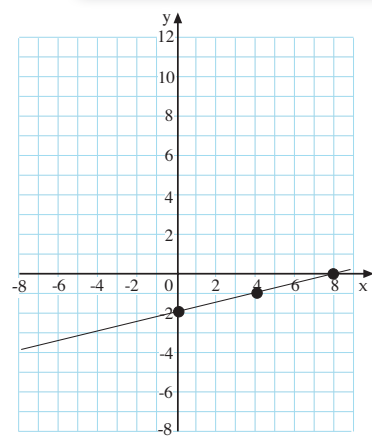
	x	y
Point 1	0	-2
Point 2	4	0
Check	2	-1



Page 70 cont...

27.

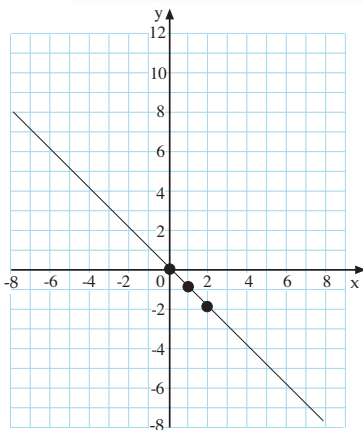
	x	y
Point 1	0	-2
Point 2	4	-1
Check	8	0



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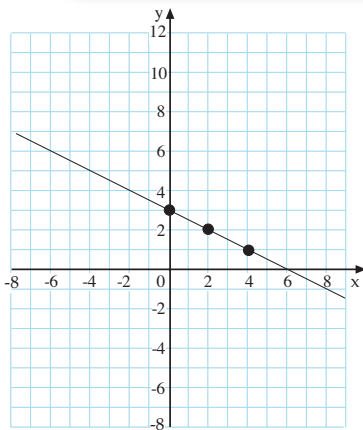
22.

	x	y
Point 1	0	0
Point 2	2	-2
Check	1	-1



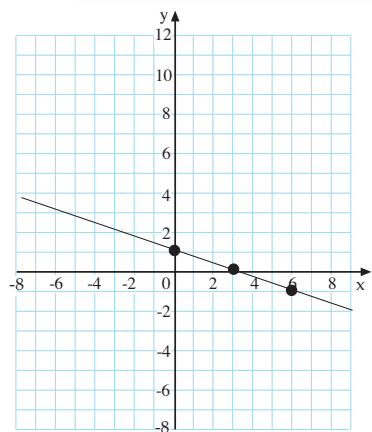
25.

	x	y
Point 1	0	3
Point 2	4	1
Check	2	2



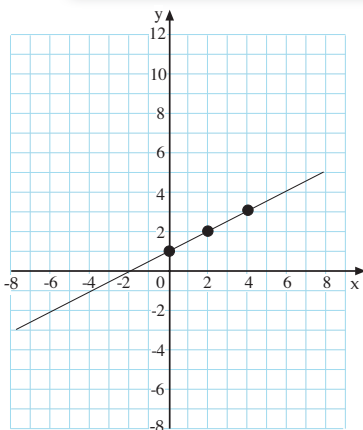
28.

	x	y
Point 1	0	1
Point 2	3	0
Check	6	-1



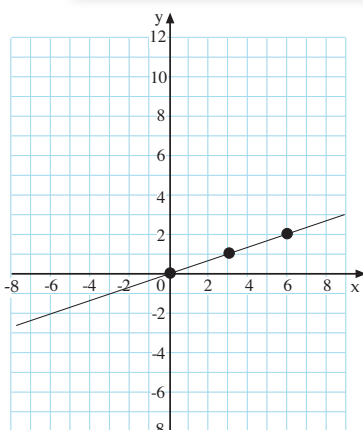
23.

	x	y
Point 1	0	1
Point 2	4	3
Check	2	2



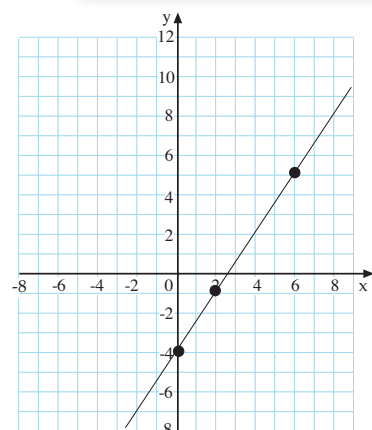
26.

	x	y
Point 1	0	0
Point 2	3	1
Check	6	2



29.

	x	y
Point 1	0	-4
Point 2	6	5
Check	2	-1



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30.

x	y
0	5
2	5
4	5

31.

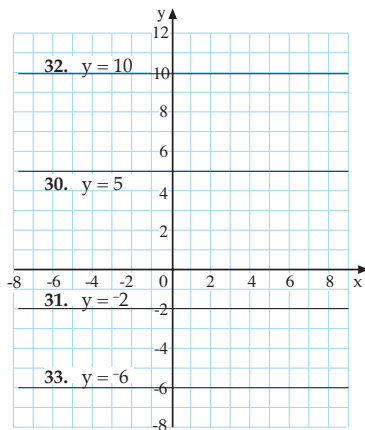
x	y
0	-2
2	-2
4	-2

32.

x	y
0	10
2	10
4	10

33.

x	y
0	-6
2	-6
4	-6



34.

x	y
7	0
7	1
7	2

35.

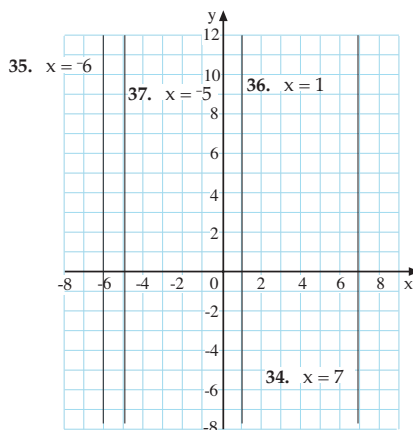
x	y
-6	0
-6	1
-6	2

36.

x	y
1	0
1	1
1	2

37.

x	y
-5	0
-5	1
-5	2



Page 73 cont...

38.

x	y
0	0
0	1
0	2

39.

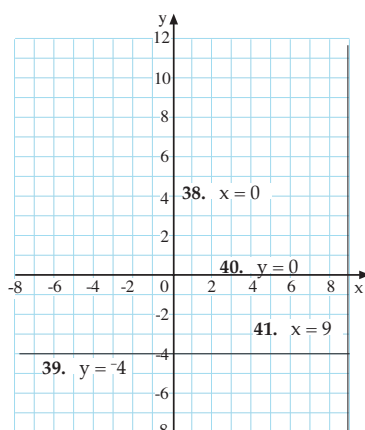
x	y
0	-4
1	-4
2	-4

40.

x	y
9	0
9	1
9	2

41.

x	y
0	0
2	0
4	0



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42. a) -1
 b) 2
 c) undefined
 d) $\frac{-1}{3}$ (-0.3333)
43. a) 1
 b) -4
 c) $\frac{-1}{2}$ (-0.5)
 d) undefined
44. a) $\frac{-1}{5}$ (0.2)
 b) 0
 c) $\frac{2}{5}$ (0.4)
 d) $\frac{-4}{3}$ (-1.333)
45. a) $\frac{-5}{6}$ (-0.8333)
 b) undefined
 c) $\frac{2}{3}$ (0.6667)
 d) $\frac{2}{7}$ (0.2857)

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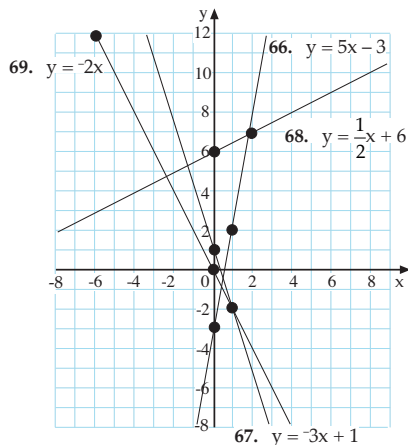
46. $\frac{3}{3} = 1$
47. $\frac{-1}{7}$ (-0.1429)
48. $\frac{-2}{3}$ (-0.6667)
49. $\frac{-7}{7} = -1$
50. $\frac{-6}{10} = \frac{-3}{5}$ (-0.6)
51. $\frac{3}{12} = \frac{1}{4}$ (0.25)
52. $\frac{0}{5} = 0$
53. $\frac{-6}{10} = \frac{-3}{5}$ (-0.6)
54. 5
55. -4
56. $\frac{2}{3}$ (0.6667)
57. $\frac{-3}{4}$ (-0.75)
58. undefined
59. 0
60. $\frac{-1}{2}$ (-0.5)
61. $\frac{2}{5}$ (0.4)

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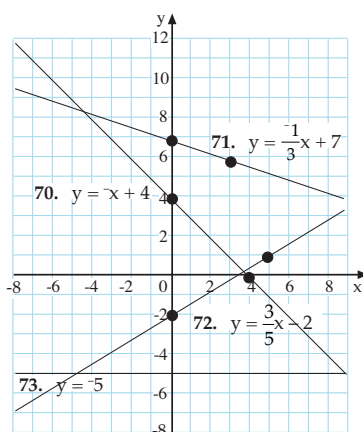
62. a) $y = 3x + 2$
 b) $y = 7$
 c) $y = \frac{-1}{3}x - 3$
 d) $y = x + 6$
63. a) $y = \frac{1}{4}x + 2$
 b) $x = -6$
 c) $y = \frac{-2}{5}x - 4$
 d) $y = -2x + 6$
64. a) $y = -5x + 7$
 b) $y = -5$
 c) $y = \frac{3}{4}x + 6$
 d) $x = -2$
65. a) $y = -x$
 b) $y = \frac{1}{8}x - 6$
 c) $y = \frac{2}{3}x + 2$
 d) $y = 11$

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66. gradient = 5
y intercept = -3
67. gradient = -3
y intercept = 1
68. gradient = $\frac{1}{2}$
y intercept = 6
69. gradient = -2
y intercept = 0

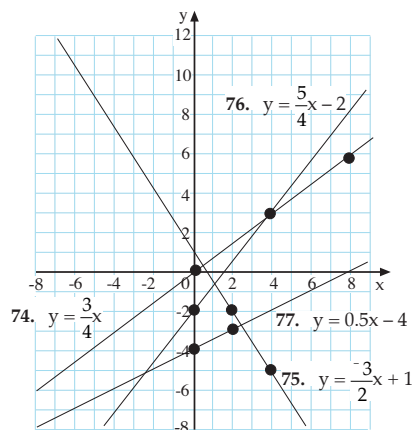


70. gradient = -1
y intercept = 4
71. gradient = $-\frac{1}{3}$
y intercept = 7
72. gradient = $\frac{3}{5}$
y intercept = -2
73. gradient = 0
y intercept = -5



Page 82 cont...

74. gradient = $\frac{3}{4}$
y intercept = 0
75. gradient = $-\frac{3}{2}$
y intercept = 1
76. gradient = $\frac{5}{4}$
y intercept = -2
77. gradient = $\frac{1}{2}$
y intercept = -4



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78. a) Line through (1, 140) and (7, 1220)
b) \$180 per year
c) $T = 180Y - 40$
d) \$2660
79. a) Line through (15, 220) and (20, 290)
b) \$14 per hour
c) $A = 14H + 10$
d) \$10

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80. a) Line through (0, 160) and (5, 760)
b) 120 m/hr
c) $E = 120H + 160$
d) 1360 m
e) 160 m
81. a) Line through (20, 17) and (40, 20)
b) 14° C
c) $T = 0.15C + 14$
d) 26° C
e) 120 chirps/minute.

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82. $x = 24$
83. $x = 24$
84. $x = -12$
85. $x = -18$
86. $x = 5$
87. $x = 11$
88. $x = -13$
89. $x = -34$
90. $x = -126$
91. $x = -65$
92. $x = -104$
93. $x = 104$
94. $x = 7$
95. $x = -17$
96. $x = -13$
97. $x = 12$

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98. $x + 27 = 62$, $x = 35$ years
99. $x - 67 = 134$, $x = \$201$
100. $18x = 810$, $x = 45$ hours
101. $24x = 11\,520$, $x = \$480$ a month
102. $\frac{x}{12} = 145$, $x = \$1740$
103. $\frac{x}{4} = 48$, $x = \$192$
104. $125x + 30 = 905$, $x = 7$ nights
105. $4x - 130 = 790$, $x = \$230$
106. $2x - 8 = 64$, $x = 36$
107. $4x + 22 = 150$, $x = 43$ years

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108. $3x = -15$, $x = -5$
109. $6x = -18$, $x = -3$
110. $-9x = -72$, $x = 8$
111. $-4x = 96$, $x = -24$
112. $-8x = -48$, $x = 6$
113. $-8x = -104$, $x = 13$
114. $-7x = -63$, $x = 9$
115. $2x = 88$
 $x = 44$
116. $4x = 10$
 $x = 2.5$
117. $3x = 8$
 $x = \frac{8}{3}$ (2.667)
118. $-4x = -3$
 $x = \frac{3}{4}$ (0.75)
119. $4x = -22$
 $x = -5.5$

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120. $4x - 7 = 2x + 15$
 $x = 11$
121. $15x = 12x + 45$
 $x = \$15/h$
122. $7x = 6x + 15$
 $x = \$15$
123. $6x + 125 = 3x + 290$
 $x = \$55/h$
124. $12x + 240 = 7x + 800$
 $x = \$112/day$
125. $12x + 490 = 6x + 844$
 $x = \$59 \text{ night}$
126. $8x + 11 = 4x - 13$
 $x = -6$
127. $3x + 2(2x) = 126$
 $x = 18 \text{ km/hr}$

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128. $4x + 28 = 64$
 $x = 9$
129. $5x - 40 = 40$
 $x = 16$
130. $7x - 14 = -42$
 $x = -4$
131. $6x + 24 = -54$
 $x = -13$
132. $-6x + 6 = -6$
 $x = 2$
133. $21 + 3x = 20$
 $x = \frac{-1}{3} (-0.3333)$
134. $12x + 4 = 76$
 $x = 6$
135. $14x - 21 = -14$
 $14x = 7$
 $x = \frac{1}{2} (0.5)$
136. $9 - 45x = 324$
 $x = -7$
137. $-6 - 15x = 99$
 $x = -7$
138. $20 - 2x = 17$
 $-2x = -3$
 $x = \frac{3}{2} (1.5)$
139. $35 - 30x = 40$
 $-30x = 5$
 $x = \frac{-1}{6} (-0.1667)$

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140. $7x + 15 = -20$
 $x = -5$
141. $-10x + 2 = 27$
 $x = -2\frac{1}{2} (-2.5)$
142. $-5x + 24 = 20$
 $x = \frac{4}{5} (0.8)$
143. $4x + 8 = 20$
 $x = 3$
144. $4(x + 8) = 68$
 $x = 9$
 Original number 9
145. $7(x - 6) = 98$
 $x = 20$
 Original number = 20
146. $3(19 - x) = 33 + x$
 $x = 6$
 Jacob gives Peter \$6
147. $5x + 3(x + 1) = 75$
 $x = 9$
 Numbers 9 and 10
148. $3(x + 10) = 8x + 10$
 $x = 4$
 Emily 4, father 32.
149. $7x + 4 = 6(x + 1)$
 $x = 2$
 Smaller 2, Larger 3.

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150. $x = 5\frac{1}{4} (5.25)$
151. $x = 60\frac{3}{4} (60.75)$
152. $x = 9$
153. $x = 7$
154. $x = 30$
155. $x = 8$
156. $x = \frac{4}{3} (1.333)$
157. $x = 3$
158. $x = 6$
159. $x = \frac{3}{10} (0.3)$

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160. $25 - \frac{x}{4} = 9$
 $x = 64$
 Number = 64
161. $3(x + 15) = 18$
 $x = -9$
 Number = -9
162. $\frac{x+55}{3} = 4$
 $x = -43$
 Number = -43
163. $\frac{x+42}{2} = 4x$
 $x = 6$
 Number = 6
164. $\frac{x-3}{2} = 15$
 $x = 33$
 Age 33 years
165. $\frac{x-5}{2} = \frac{x+3}{4}$
 $x = 13$
 Age 13 years
166. $\frac{2x+18}{5} = \frac{x}{2}$
 $x = 36 \text{ cm}$
 Longer 45 cm
167. $36x + 12(x + 25) = 2460$
 $x = 45$
 45 cents and 70 cents each
168. $\frac{x}{12} = \frac{x}{14} + 4$
 $x = 336$
 336 chocolates
169. $\frac{2x}{3} + \frac{3(x+1)}{5} = 31$
 $x = 24$
 Numbers 24 and 25

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170. $x = 14$
171. $y = 19$
172. $x = 17$
173. $w = 1$
174. $q = 15$
175. $x = 13$
176. $3x + 3 = 42$
 $x = 13$
 Numbers 13, 14 and 15
177. $42x + 16(x - 1) = 216$
 $x = 4$
 Steak \$4, bacon and egg \$3.

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178.

Pattern no.	Value	1st Diff.	2nd Diff.
1	4		
2	7	3	
3	12	5	2
4	19	7	2
5	28	9	2
6	39	11	2
7	52	13	

$V = n^2 + 3$
 $V(10) = 103$

179.

Pattern no.	Value	1st Diff.	2nd Diff.
1	2		
2	11	9	
3	26	15	6
4	47	21	6
5	74	27	6
6	107	33	6
7	146	39	

$V = 3n^2 - 1$
 $V(10) = 299$

180.

Pattern no.	Value	1st Diff.	2nd Diff.
1	0		
2	6	6	
3	16	10	4
4	30	14	4
5	48	18	4
6	70	22	4
7	96	26	4

$V = 2n^2 - 2$
 $V(10) = 198$

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181.

Pattern no.	Value	1st Diff.	2nd Diff.
1	6		
2	12	6	
3	22	10	4
4	36	14	4
5	54	18	4
6	76	22	4
7	102	26	4

$V = 2n^2 + 4$
 $V(10) = 204$

182.

Pattern no.	Value	1st Diff.	2nd Diff.
1	-3		
2	0	3	
3	5	5	2
4	12	7	2
5	21	9	2
6	32	11	2
7	45	13	

$V = n^2 - 4$
 $V(10) = 96$

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183.

Pattern no.	Value	1st Diff.	2nd Diff.
1	1		
2	13	12	
3	33	20	8
4	61	28	8
5	97	36	8
6	141	44	8
7	193	52	8

$V = 4n^2 - 3$
 $V(10) = 397$

184.

Pattern no.	Value	1st Diff.	2nd Diff.
1	-4		
2	-1	3	
3	4	5	2
4	11	7	2
5	20	9	2
6	31	11	2
7	44	13	2

$V = n^2 - 5$
 $V(10) = 95$

185.

Pattern no.	Value	1st Diff.	2nd Diff.
1	0.5		
2	2	1.5	
3	4.5	2.5	1
4	8	3.5	1
5	12.5	4.5	1
6	18	5.5	1
7	24.5	6.5	1

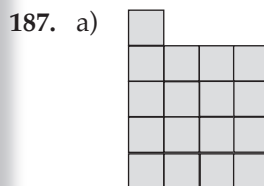
$V = 0.5n^2$
 $V(10) = 50$

186.

Pattern no.	Value	1st Diff.	2nd Diff.
1	-1		
2	-4	-3	
3	-9	-5	-2
4	-16	-7	-2
5	-25	-9	-2
6	-36	-11	-2
7	-49	-13	-2

$V = -n^2$
 $V(10) = -100$

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b)

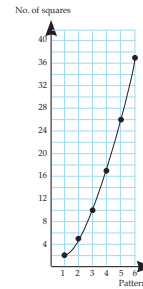
Pattern	No. of squares
1	2
2	5
3	10
4	17
5	26
6	37

c)

Pattern no.	Squares	1st Diff.	2nd Diff.
1	2		
2	5	3	
3	10	5	2
4	17	7	2
5	26	9	2
6	37	11	2

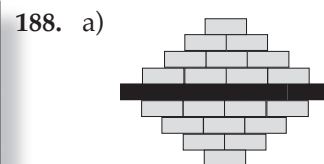
d) Since the second differences are constant the pattern is that of a quadratic.

- e) $S = P^2 + 1$
- f) $S = 226$
- g) $S = 677$
- h) $P = 11$
- i) $P = 35$
- j)



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187. k) parabola



b)

Design	No. of pavers
1	2
2	6
3	12
4	20
5	30
6	42

c)

Design no.	Pavers	1st Diff.	2nd Diff.
1	2		
2	6	4	
3	12	6	2
4	20	8	2
5	30	10	2
6	42	12	2

d) Since the second differences are constant the pattern is that of a quadratic.

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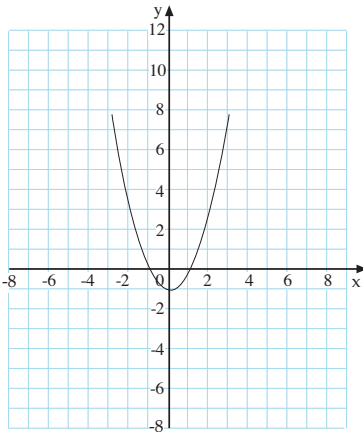
e) $N = D^2 + D$

f) $N = 156$

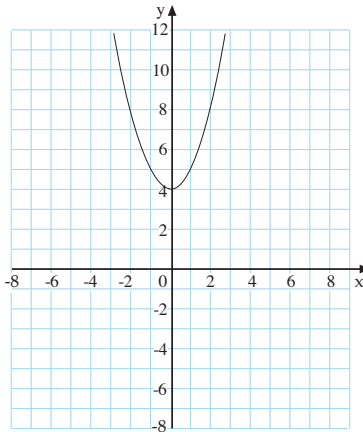
g) $N = 420$

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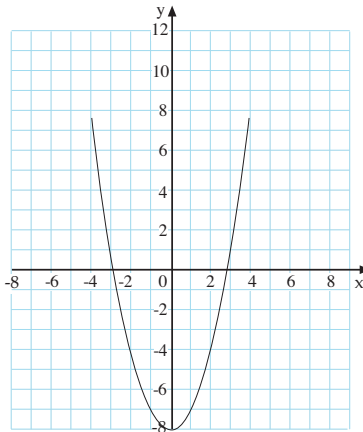
189.



190.

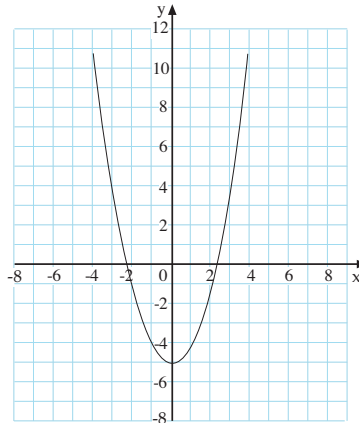


191.

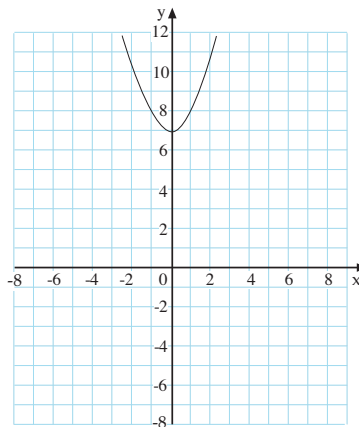


Page 107

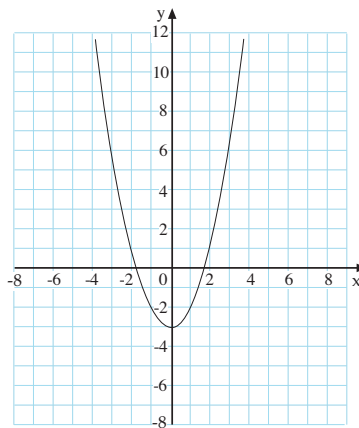
192.



193.

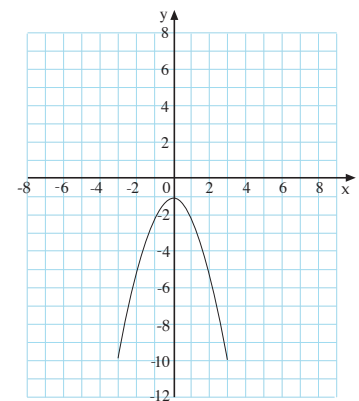


194.



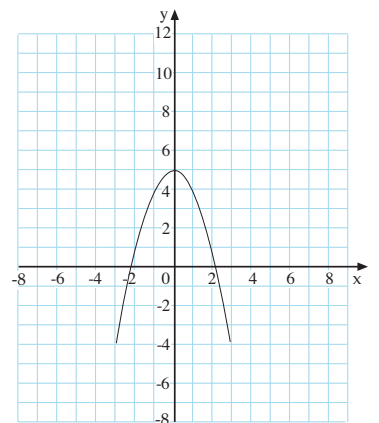
Page 110

195.

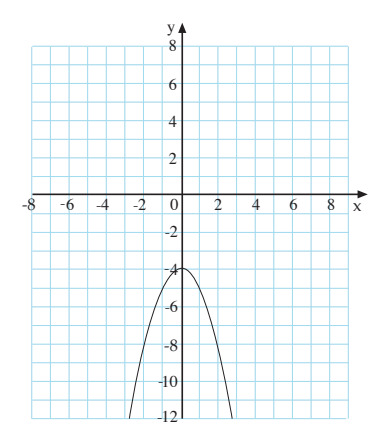


Page 110 cont...

196.

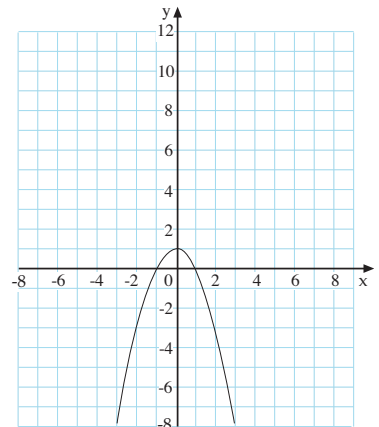


197.

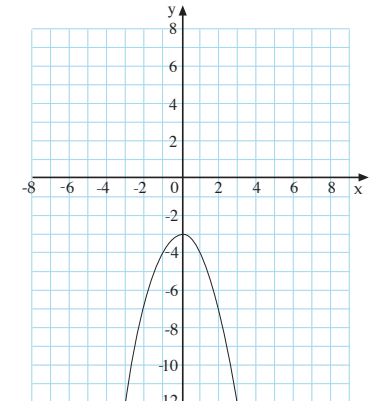


Page 111

198.

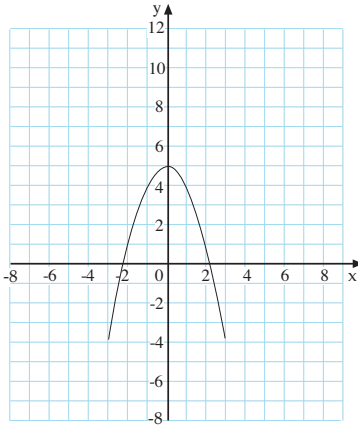


199.



Page 111 cont...

200.



Page 113

201. $4x - 4$

202. $2a + 4b - 2c$

203. $x^2 + 5x$

204. $6y - 10x$

205. $-3x^2 + 15x$

206. $-x^2 - 9x$

207. $x^2 - 5x - 14$

208. $y^2 - 8y + 15$

209. $x^2 + 4x - 32$

210. $x^2 - 6x - 27$

211. $x^2 - 6x + 9$

212. $x^2 + 16x + 64$

213. $x^2 - 49$

214. $x^2 + 12x + 34$

Page 114

215. $2x^2 - 3x - 2$

216. $4x^2 - 4x + 1$

217. $16k^2 + 24k + 9$

218. $6x^2 - 18x + 8$

219. $9m^2 + 12m + 4$

220. $10x^2 + 23x$

221. $4x^2 - 18x$

222. $3x^2 + 6x - 5$

223. $x^2 + 6x + 8$

224. $9x^2 + 21x + 12$

225. $x^2 - 8x + 15$

226. $2x^2 + 9x + 8$

Page 116

227. $6(x - 2y)$

228. $4q(p - 3q)$

229. $b(a - b - a^2)$

230. $x(x + 4)$

231. $6(3x - 5)$

232. $6x(2x - 1)$

233. $ab(3c - 4)$

234. $5ab^2(2b + 3a)$

235. $5y(x + 5)$

236. $4pq(p - 3q + 4)$

237. $2g(8 + 7h^2)$

238. $6q(6q^4 + 4q^2 - 3)$

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239. $(x + 1)(x + 6)$

240. $(x + 8)(x + 4)$

241. $(x - 3)(x - 2)$

242. $(x + 5)(x - 2)$

243. $(x + 10)(x - 2)$

244. $(x + 13)(x - 2)$

245. $(x - 7)(x - 3)$

246. $(x - 2)(x - 1)$

247. $(x - 6)(x - 8)$

248. $(x + 7)(x - 12)$

249. $(x - 8)(x + 2)$

250. $(x - 8)(x + 4)$

251. $(x - 20)(x - 2)$

252. $(x + 9)(x + 3)$

253. $(x - 9)(x - 4)$

254. $(x + 6)(x - 5)$

255. $(x - 6)(x + 5)$

256. $x(x - 9)$

257. $(x - 6)(x + 3)$

258. $(x + 15)(x + 15) = (x + 15)^2$

259. $(x - 9)(x + 11)$

260. $2(x + 3)(x + 1)$

261. $3(x - 9)(x - 3)$

262. $4(x - 2)(x + 4)$

Page 117 cont...

263. $9x + 9$

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264. $(x + 1)(x - 1)$

265. $(x + 6)(x - 6)$

266. $(x + 10)(x - 10)$

267. $(x + 2)(x - 2)$

268. $3(x + 1)(x - 1)$

269. $4(x + 6)(x - 6)$

270. $(x + 7)(x + 7) = (x + 7)^2$

271. $(x - 4)(x - 4) = (x - 4)^2$

272. $(x + 12)(x + 12) = (x + 12)^2$

273. $(x - 9)(x - 9) = (x - 9)^2$

274. $3(x - 2)(x - 2) = 3(x - 2)^2$

275. $2(x - 4)(x - 4) = 2(x - 4)^2$

Page 120

276. $x = 3, -2$

277. $x = 5, -4$

278. $x = 0, -7$

279. $x = 2$

280. $x = 1, -3$

281. $x = 0, 1$

282. $x = 7, -9$

283. $x = 3, 5$

284. $x = -4$

285. $x = -5, -2$

286. $x = -6, 3$

287. $x = 8, -4$

288. $x = -6, -2$

289. $x = 3, -4$

290. $x = 6, 4$

291. $x = -5, -3$

292. $x = 11, -7$

293. $x = -9, 4$

294. $x = -15, 5$

295. $x = 7, 5$

296. $x = 12, -12$

297. $x = 1, 3$

Page 120 cont...

298. $x = 9, 6$

299. $x = 0, 3$

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300. $x^2 + 15 = 51$
 $x = 6, -6$
 Numbers are 6 or -6 .

301. $x^2 + x = 20$
 $x = 4, -5$
 Numbers are 4, 5 or $-5, -4$.

302. $x^2 + 4x = 77$
 $x = 7, -11$
 Length 7 cm and 11 cm.
 Ignore $x = -11$.

303. $x^2 - 5x = 176$
 $x = 16, -11$
 Jill 16, Jack 11.
 Ignore $x = -11$.

304. $x^2 - 5x = 84$
 $x = 12, -7$
 Length 12 m and 7 m.
 Ignore $x = -7$.

305. $x^2 + x = 30$
 $x = 5, -6$
 Number is 5. Ignore $x = -6$

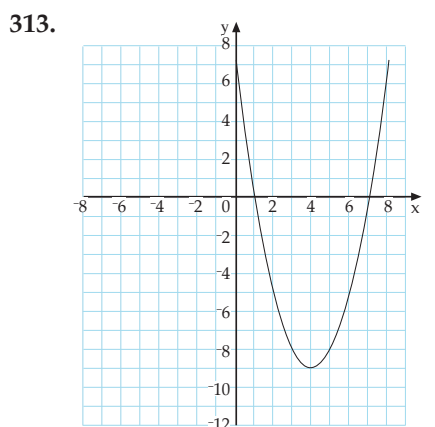
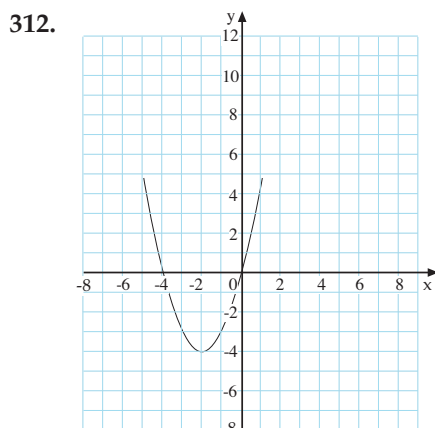
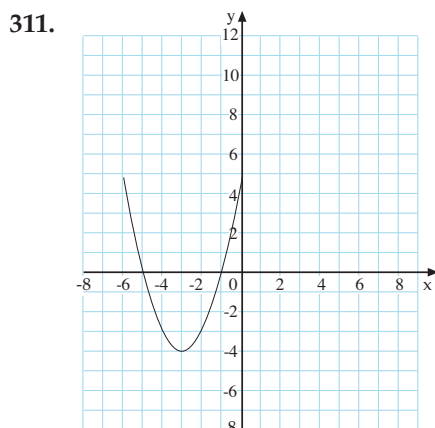
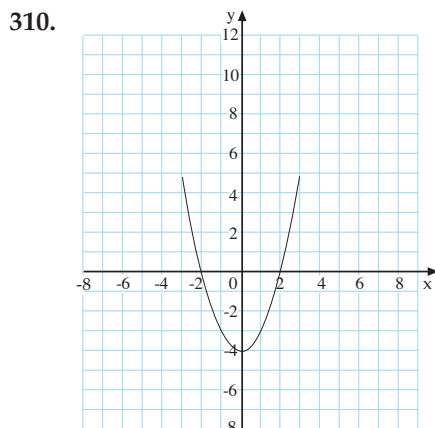
306. $x^2 + 5x + 6 = 90$
 $x = 7, -12$
 Length of original is 7 m
 Ignore $x = -12$.

307. $x^2 + 2x = 143$
 $x = 11, -13$
 Numbers are 11, 13 or $-13, -11$.

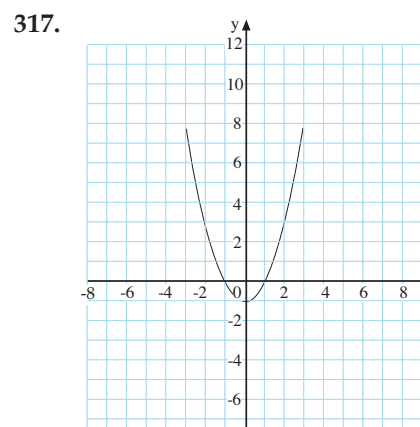
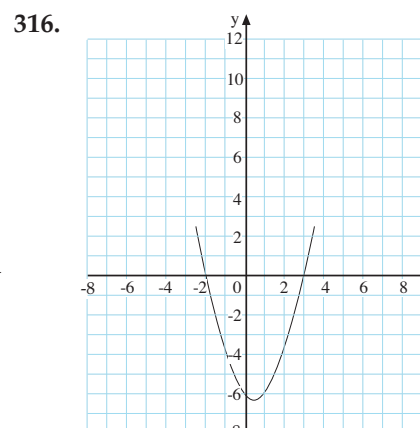
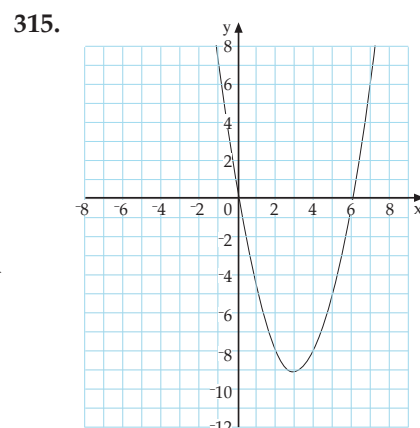
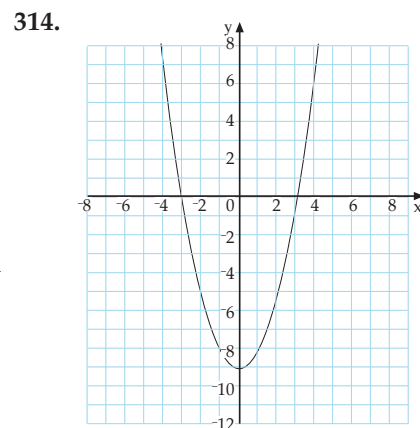
308. $x^2 - 2x - 8 = 91$
 $x = 11, -9$
 Length of original is 11 m
 Ignore $x = -9$.

309. $x^2 + 6x = 112$
 $x = 8, -14$
 Ages 8 and 14.
 Ignore $x = -14$.

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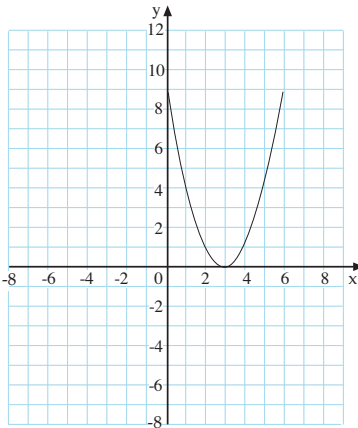


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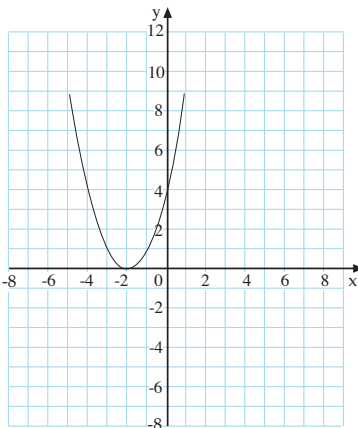


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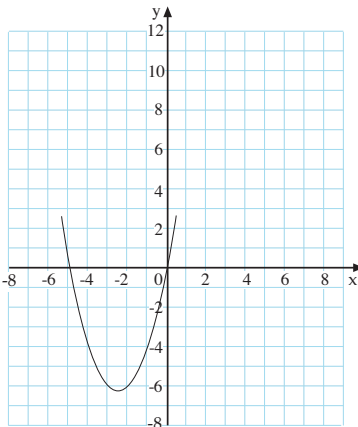
318.



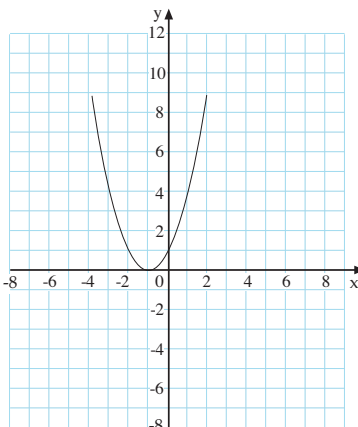
319.



320.



321.



Page 129

322. $y = \frac{x}{h}$

323. $x = \frac{y+4}{3}$

324. $y = \frac{20-4x}{5}$

325. $d = \frac{v^2 - u^2}{2a}$

326. $h = \frac{A}{\pi r^2}$

327. $Q = \frac{R-6P+3}{4}$

328. $x = 6y$

329. $a = 2m - b$

330. $C = \frac{4A}{B}$

331. $x = (m + 2)^2$

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332. a) \$535

b) $K = \frac{3C-5}{4}$

c) 748.75 km

333. a) $V = 940 \text{ cm}^3$ (2 sf)

b) $h = \frac{V}{\pi r^2}$

c) $h = 7.1 \text{ cm}$ (2 sf)

334. a) $T = 100$ minutes

b) $K = \frac{T-25}{30}$

c) $K = 3.5 \text{ kg}$

d) $K = 3.8 \text{ kg}$

Page 132

335. $7x + 4$

336. $-5y + 11$

337. $-z - 6$

338. $-2k - 11$

339. $2x^2 + 2x + 1$

340. $3x^2 - 6x$

341. $-n^2 - 2n + 7$

342. $3q^2 + 2q - 3$

343. $13k + 5$

344. $2m^2 + 2m$

Page 132 cont...

345. $a^2 + 5a - 3b$

346. $-3ab + 19$

347. $x^2 - 8x + y$

348. $t^2 - 6t - 2$

349. $2pq - p + q$

350. y^2

351. $4pq - 5$

352. $x^3 - x^2 + x$

353. $4xy + 4x$

354. $2x - 2z$

355. $21ab - 13$

356. $8xy - 7x - y$

357. $-2y^2 - 6$

358. $5ab + 2ac$

359. $2x - 3y$

360. $-4k + 3$

361. $2x^2 + 9x - 9$

362. $-3pq - 5$

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363. $2y^5$

364. $12a^2b^3$

365. $3q^5$

366. $4y^5$

367. $15a^2b^3$

368. $2m^9$

369. $18y^5$

370. $2p^2q^2$

371. $12a^3b^2$

372. $8y^6$

373. $36a^4b^3$

374. $24m^4n^5$

375. $30u^5v^{10}$

376. $24a^7b^3$

377. $6m^7n^5$

378. $16x^{12}$

379. $16x^2y^6$

380. $125p^3q^6$

Page 134 cont...

381. $64m^4n^6$

382. $27a^6b^{15}$

383. $p^6q^9r^{12}$

384. $32a^7$

385. $9m^5n^3$

386. $80a^5b^3$

387. $64x^9$

388. $16y^6$

389. $12x^4y^2$

390. a^8b^{15}

391. $4a^{11}b^{12}$

392. $27p^{12}q^6r^{15}$

Page 136

393. $4x$

394. $-8xy$

395. $6a$

396. $3a$

397. $\frac{2}{5b}$

398. $\frac{1}{4q}$

399. $\frac{3n}{4m}$

400. $\frac{1}{5b^2}$

401. $\frac{2}{3b}$

402. $\frac{7a}{5}$

403. $\frac{1}{5p}$

404. $\frac{2}{3mn}$

405. $\frac{x}{y^2}$

406. $\frac{5m^2}{2n^2}$

407. $\frac{5}{2p^2q^3}$

408. $\frac{2h}{g}$

Page 136 cont...

409. $\frac{-28}{3y}$

410. $\frac{7r^3}{3pq}$

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411. $12 - x$

412. $\frac{(x+3)}{5}$

413. $(x+2) - 5$

414. $2x + 4$

415. $9 - x^2$

416. $x^2 + 2x$

417. $3x - 5$

418. $x - 5^2$

419. $x + (x + 4)$

420. $x(x + 3)$

421. $x(x + 1)$

422. $x + (x + 2)$

423. $\frac{\sqrt{x}}{x}$

424. $4 - 7x$

425. $x(x + 1)(x + 2)$

426. $\frac{x + (x + 1)}{2}$

427. $x - (3x + 6)$

428. $x + 7x$

429. $x - x^2$

430. $x + 3x$

431. $\left(\frac{x}{7}\right)^2$

432. $x(4 - x)$

433. $2x^2 - 3$

434. $4x^2 + 5$

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435. $2x + 15 = 43$

$x = 14$

436. $3x - 9 = 21$

$x = 10$

Page 139 cont...

437. $x + 3x = 64$

$x = 16$

438. $\frac{x-4}{9} = 12$

$x = 112$

439. $x^2 - 9 = 16$

$x = 5, -5$

440. $x(x + 1) = 72$

$x = 8, -9$

Consecutive numbers 8, 9 and -9, -8.

441. $x(x + 2) = 63$

$x = 7, -9$

Consecutive odd numbers 7, 9 and -9, -7.

442. $x(x + 5) = 176$

$x = 11, -16$

Length 16, width 11.

Ignore -16.

443. $x + (x + 1) + (x + 2) = 57$

$x = 18$

Consecutive numbers 18, 19 and 20.

444. $\frac{x}{x+3} = 4$

$x = -4$

Topic 3 Measurement

Page 141

1. 350 mm
2. 6000 mm
3. 0.05 m
4. 2.4 cm
5. 4800 m
6. 260 cm
7. 252 mm
8. 6000 m
9. 1 350 000 cm
10. 0.0038 km
11. 0.0152 m
12. 0.000 185 km
13. 0.0643 km
14. 386 mm
15. 70 000 cm
16. 0.0248 km
17. 164.5 mm
18. 0.3546 km
19. 0.295 km
20. 13 700 cm
21. 0.345 65 km
22. 0.228 km

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23. 2.8 ha
24. 46 000 cm²
25. 3.75 cm²
26. 840 mm²
27. 15 800 m²
28. 0.135 ha
29. 3500 cm²
30. 15 000 mm²
31. 34.8 m²
32. 0.0157 m²
33. 145 cm
34. 210 mm
35. 24 600 m
36. 1.2 ha
37. 47.5 cm
38. 72.8 km
39. 135 000 cm
40. 43 000 m²

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41. 31 080 mm²
42. 12.6 m²
43. 1800 cm²
44. 97 m²
45. 9550 mm
46. 6200 strides
47. 8.75 cm²
48. 36 000 cm²
49. 76 m
50. 3 150 000
51. m
52. cm or mm
53. m²
54. mm
55. m
56. m or cm
57. ha
58. km
59. m or km
60. mm²
61. mm
62. cm²
63. km²
64. mm

Page 147

65. 2.5 kg
66. 5750 g
67. 250 mg
68. 0.45 T
69. 2.25 g
70. 3500 kg
71. 1 450 000 mg
72. 15 000 mg
73. 12.5 g
74. 24.58 T
75. kg
76. g
77. g
78. kg
79. mg
80. mg
81. mg or g
82. mg
83. T
84. T
85. mg or g
86. g

Page 147 cont...

87. mg
88. mg

Page 148

89. feather, \$2, golf ball, ice cream, kitten, kiwi, bucket of water, bike, car.
90. 320 mg, 0.75 g, 1250 mg, 2400 mg, 15 g, 0.45 kg, 580 g, 0.24 T, 250 kg, 350 kg.
91. 0.72 L
92. 5250 mL
93. 1.48 L
94. 350 mL
95. 0.94 m³
96. 1500 cm³
97. 5.3 m³
98. 8600 L
99. 3200 mL
100. 0.95 cm³
101. 150 000 mL
102. 48 000 mm³
103. 20 000 cm³
104. 0.048 m³
105. 65 L
106. 4.8 mL

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107. mL
108. L
109. mL
110. m³
111. m³
112. L
113. mm³
114. mL
115. L
116. mL, mm³
117. mL
118. cm³
119. 2.7 cm³, 3.5 cm³, 4.5 cm³, 7.5 cm³.
120. 6.75 kg
121. 4.44 T
122. 2.125 kg
123. 4850 thimbles
124. 26 hours
125. 60 000 grains

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- 126. 33 cm
- 127. 37 inches
- 128. 63.5 cm
- 129. 33.5 inches
- 130. 220 yards
- 131. 550 metres
- 132. 1640 yards
- 133. 1280 metres
- 134. 84 miles
- 135. 91.5 km (92 km)
- 136. 71.5 miles
- 137. 46.5 km (47 km)

138. $2\frac{3}{4}$ inches

139. 92 mm

140. $2\frac{1}{4}$ inches

141. 73 mm

142. A - 17 mm, B - 102 mm

C - $1\frac{1}{8}$ inches,

D - $3\frac{13}{16}$ inches.

143. a) 0.1 kg

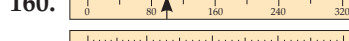
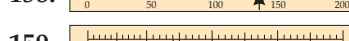
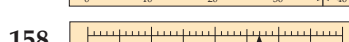
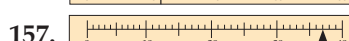
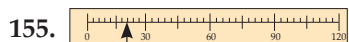
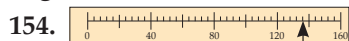
b) A = 1.1 kg, B = 3.5 kg

C = 0.3 kg, D = 4.4 kg

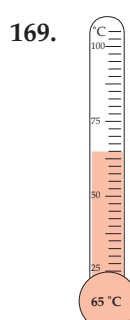
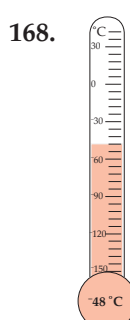
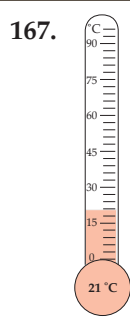
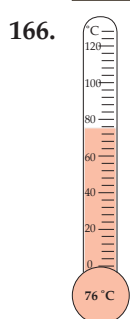
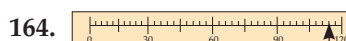
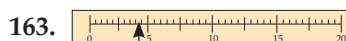
Page 153

- 144. 40 °C
- 145. 54 °C
- 146. 5 °C
- 147. 43 °C
- 148. A = 50 km/h, B = 380 km/h
- 149. C = 285 km/h, D = 5 km/h
- 150. E = 14 km/h, F = 71 km/h
- 151. A = 100, B = 40
- 152. C = 240, D = 320
- 153. E = 35, F = 115

Page 154



Page 154 cont...



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- 170. 26.2 m
- 171. 294.4 mm
- 172. 56.2 cm
- 173. 45.4 cm

Page 158

- 174. 32.8 m
- 175. 26.2 m
- 176. 30.1 cm
- 177. 121.2 cm
- 178. 56.2 m
- 179. 45.95 m
- 180. 31.7 m
- 181. 87.6 cm

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- 182. 17.0 cm (3 sf)
- 183. 27.2 m (3 sf)
- 184. 47.8 cm (3 sf)
- 185. 80.4 mm (3 sf)
- 186. 14.7 cm (3 sf)
- 187. 5.18 m (3 sf)
- 188. 538 m (3 sf)
- 189. 86.8 cm (3 sf)

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- 190. 66.1 cm (3 sf)
- 191. 92.7 m (3 sf)
- 192. 44.7 cm (3 sf)
- 193. 30.1 cm (3 sf)
- 194. a) 204 m (3 sf)
b) 216 m (3 sf)
c) 22.5 laps

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- 195. Approximately 140 mm
- 196. Approximately 85 mm
- 197. Approximately 157 mm
- 198. Approximately 260 mm
- 199. Approximately 208 mm
- 200. Approximately 176 mm
- 201. Approximately 149 mm

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- 202. 71.4 cm² (3 sf)
- 203. 42.6 m² (3 sf)
- 204. 59.2 mm² (3 sf)
- 205. 68.4 m² (3 sf)
- 206. 35.9 cm² (3 sf)
- 207. 50.5 cm² (3 sf)
- 208. 27.1 m² (3 sf)
- 209. 73.0 mm² (3 sf)
- 210. 211 m² (3 sf)

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- 211. b = 25, h = 32, A = 400 mm²
- 212. a = 57, b = 32, A = 912 mm²
- 213. r = 19, A = 1134 mm²
- 214. a = 62, b = 40, h = 26, A = 1326 mm²
- 215. b = 65, h = 28 A = 1820 mm²
- 216. b = 36, A = 1296 mm²
- 217. b = 72, h = 30, A = 2160 mm²

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- 218. 5.5 m
- 219. 135 m²
- 220. 398 cm² (3 sf)
- 221. 123 m
- 222. 1.5 m by 1.5 m
- 223. C = 26.4 m (3 sf)
A = 55.4 m² (3 sf)
- 224. 2 times
- 225. 470 m²
- 226. 31 000 cm² (2 sf)
- 227. 561 m²

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228. 28 cm
 229. 22 m
 230. $A = 9.1 \text{ mm}^2$ (2 sf)
 $P = 12 \text{ mm}$ (2 sf)
 231. 6 m and 8 m
 232. 22 cm
 233. 3 m
 234. 450 m^2 (2 sf)
 235. Base 13 m, height 16 m
 236. Width 3 m, length 6 m
 237. 4

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238. 3.76 m^2 (3 sf)
 239. 78 m^2 (2 sf)

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240. 58.0 m^2 (3 sf)
 241. 296 cm^2 (3 sf)
 242. 257 mm^2 (3 sf)
 243. 89 cm^2 (2 sf)

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244. 65.9 m^2 (3 sf)
 245. 296 cm^2 (3 sf)
 246. 1760 mm^2 (3 sf)
 247. 146 cm^2 (3 sf)

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248. 605 cm^3 (3 sf)
 249. 19.8 m^3 (3 sf)
 250. 300 cm^3 (3 sf)
 251. 655 m^3 (3 sf)
 252. 1100 cm^3 (3 sf)
 253. 3.29 m^3 (3 sf)

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254. 41 cm^3 (2 sf)
 255. 96.5 m^3 (3 sf)
 256. 2.13 m^3 (3 sf)
 257. 470 m^3 (3 sf)
 258. 0.92 m^3 (2 sf)

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259. 4 cm
 260. 142 cm^3 (3 sf)
 261. 4.30 cm (3 sf)
 262. 10.6 cm (3 sf)
 263. 19 m^3 (2 sf)
 264. 528 mL
 265. 0.65 m (2 sf)
 266. $2\,590\,000 \text{ m}^3$ (3 sf)

Page 176 cont...

267. 2.4 m (2 sf)
 268. 2.6 m^3 (2 sf)

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269. 150 units²
 270. $12\,100 \text{ mm}^2$ (3 sf)
 271. 72 m^2 (2 sf)
 272. 160 cm^2 (2 sf)

Page 180

273. 3290 cm^2 (3 sf)
 274. 6.9 m (2 sf)
 275. $31\,800 \text{ mm}^2$ (3 sf)
 276. 110 cm^2 (2 sf)

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277. 160 m^2 (2 sf)
 278. 91 cm^2 (2 sf)
 279. 11 m^2 (2 sf)
 280. 750 cm^2 (2 sf)

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281. Painted area = $2122.84\dots \text{ m}^2$
 2 coats = 4246 m^2
 67 tins of paint
 282. Total area of nylon = 18.4 m^2
 283. Painted area = $29.256\dots \text{ m}^2$
 2 coats = 58.5 m^2
 1 four litre tin of paint
 284. $SA = 1664.64 \text{ cm}^2$
 Area = 0.17 m^2 (2 sf)
 Has enough paper to wrap the gift.

Page 185

285. a) Diagram of cone with height 1.3 and radius 1.6 m.
 b) 3.5 m^3 (2 sf)
 c) Reasonable model however cone rises to a point where soil would not. Also unlikely soil has a perfectly circular base. Overall best solid to model with would be a cone but likely value is greater than actual volume.
 286. a) Diagram of a circle and attached to this a semi-circle. Circle radius would be 2.4 m and semi-circle radius 1.8 m.
 b) 23 m^2 (2 sf)

Page 185 Q286 cont...

- c) Circle plus semi-circle would be a reasonable approximation. Complete circle would overestimate the large circle but semi-circle would underestimate smaller part circle so overall calculation likely to be less than the actual area.

Page 186

287. a) Diagram of a rectangular cuboid and a semi-circular based prism added together. Rectangular cuboid has measurements 7.5 cm by 8.0 cm by 18.5 cm. Semi-circular prism has radius 4 cm and height 18.5 cm.
 b) 680 cm^2 (2 sf)
 c) Reasonable model with rectangular cuboid being a good estimate for the base of the loaf of bread however semi-circular prism may not reflect the more elliptical based prism of the top of the loaf of bread.
 288. a) Diagram of a two cylinders and a cone all added together. First cylinder has base radius of 0.90 cm and height 4.45 cm and second cylinder has base radius 0.75 cm and height 1.90 cm. Cone has radius 0.75 cm and height 2.85 cm.
 b) 16.4 cm^3 (3 sf)
 c) Two cylinders and one cone solid would model bullet shaped flash drive well. Cone likely to be slightly less than the actual pointed end of the bullet as it has a more rounded end.

Page 187

289. a) Diagram of a hexagonal coin split into two trapezia with top length = 19 mm, base length = 9.5 mm and height = 8.5 mm.
 b) 240 mm² (2 sf)
 c) Excellent model as two trapezia model the coin accurately.
290. a) Diagram of a cylinder with radius 11.5 cm (the average of 14 cm and 9 cm) and height 23 cm.
 b) 9600 cm³ (2 sf)
 9.6 litres
 c) Since we don't know the formula for a truncated cone averaging the radius of the bottom and top of the bucket and using this as the radius of a cylinder with height 23 cm will give a reasonable approximation of volume but slightly less than the actual volume.

Page 190

291. 0425
 292. 1610
 293. 0025
 294. 2240
 295. 1200
 296. 2037
 297. 1550
 298. 0807
 299. 0605
 300. 0000 or 2400
 301. 1425
 302. 2030
 303. 2:35 pm
 304. 8:50 am
 305. 10:55 pm
 306. 7:25 am
 307. 9:40 pm
 308. 11:10 am
 309. 12:20 pm
 310. 1:55 am
 311. 8:05 pm
 312. 12:55 am

Page 190 cont...

313. 5:56 pm
 314. 1:57 am
 315. 13 hours 52 minutes
 316. 21 hours 45 minutes
 317. 19 hours 50 minutes
 318. 27 hours 3 minutes
 319. 17 hours 16 minutes
 320. 16 hours 38 minutes
- Page 191
321. 10 hours 5 minutes
 322. 8 hours 30 minutes
 323. 40 hours 25 minutes
 324. 81 hours 55 minutes
 325. 31 hours
 326. 17 hours 40 minutes
 327. 102
 328. 353
 329. 161
 330. 68
 331. 11 hours 29 minutes
 332. 4 days 6 hours 5 minutes
 333. 19 days 16 hours 30 minutes
 334. 5313

Page 193

335. a) 1 hour
 b) The channel crossing on the bus is either by rail or ferry.
 c) night services
 d) 8 hours 30 minutes
 e) 8 hours
 f) 10 hours because it makes stops at Gillingham, Canterbury and Dover on the way.
 g) 75

Page 195

336. a) 1622
 b) 1737
 c) 1550
 d) 1657
 e) 3 hours 20 minutes
 f) 6
 g) 2
 h) 3
 i) 3 minutes

Page 195 Q336 cont...

- j) 18 minutes
 k) 51 minutes
 l) Because of demand as a result of the number of flights arriving at Manchester airport.

Page 197

337. a) 1635
 b) 25th July
 c) 6
 d) 2
 e) 3 hours 40 minutes
 f) 1109
 g) 0422
 h) 3
338. a) 20 minutes
 b) 3
 c) People getting to or from work.
 d) 10 minutes
 e) East by West Ferry
 f) 80

Page 199

339. a) 1455
 b) 70 mins
 c) 0025
 d) 1 hour 45 minutes
 e) 4
 f) 5 minutes
 g) TV Four (20 shows)
 h) The Suit on the Set
 i) The Crows Goes Wild (Prime)
 j) 55 minutes
340. a) 20 minutes
 b) 4
 c) 6 hours 30 minutes.
 d) 76.9% (1 dp)

Page 202

341. a) 84+
 b) 54 - 59
 c) Good
 d) Below Average
 e) Below average for male compared to average for female.

Page 202 Q341 cont...

- f) The greater the level of fitness the lower the heart rate.
- g) No, in all age categories and levels of fitness females have higher resting heart rates, e.g. in the age group 18 – 25 a good level of fitness for males is a heart rate of 62 – 65 compared to 66 – 69 for a female.

Page 203

342. a) 9:08 am, 3.1 metres
b) Wednesday 5:59 am
c) Wednesday
d) 1:23 am and 1:48 pm
e) 0.4 metres
f) 6 hours 16 minutes
g) 13 hours 30 minutes
h) 10 hours 30 minutes

Page 204

343. a) 273 km
b) 161 km
c) 3 hours 45 minutes
d) 75 km/h (2 sf)
e) 507 km
f) 4 hours
g) Walpole to Albany
Walpole to Manjimup
h) Dunsborough

Page 205

344. a) 6 years
b) 10 years
c) Timber with substantial areas exposed to weather for substantial time or never painted.
d) 6 years
e) Cementitious that is new and in excellent condition
f) Requires preparatory work and spot priming.

Topic 4
Geometry

Page 208

1. $\angle ABC = 140^\circ$
2. $\angle DEF = 30^\circ$
3. $\angle GHI = 220^\circ$
4. $\angle JKL = 90^\circ$
5. $\angle MNO = 133^\circ$
 $\angle ONP = 65^\circ$
 $\angle MNP = 162^\circ$
6. $\angle QRS = 180^\circ$
 $\angle QRT = 150^\circ$
 $\angle SRT = 30^\circ$

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7. $\angle ABC = 60^\circ$
 $\angle BCA = 60^\circ$
 $\angle CAB = 60^\circ$
8. $\angle DEF = 49^\circ$
 $\angle EFD = 98^\circ$
 $\angle FDE = 33^\circ$
9. $\angle GHI = 130^\circ$
 $\angle HIJ = 97^\circ$
 $\angle IJG = 65^\circ$
 $\angle JGH = 68^\circ$
10. $\angle KLM = 106^\circ$
 $\angle LMN = 104^\circ$
 $\angle MNO = 117^\circ$
 $\angle NOK = 99^\circ$
 $\angle OKL = 114^\circ$

Page 212

11. $a = 57^\circ$,
Adj. \angle s on a str. line = 180°
12. $b = 105^\circ$,
 \angle s at a pt = 360°
13. $c = 82^\circ$,
Vert. opp. \angle s are =
14. $d = 20^\circ$,
Adj. \angle s on a str. line = 180°

Page 213

15. $e = 99^\circ$,
Adj. \angle s on a str. line = 180°
16. $f = 96^\circ$,
Int. \angle s of a $\triangle = 180^\circ$
17. $g = 38^\circ$,
Int. \angle s of a $\triangle = 180^\circ$
 $h = 142^\circ$,
Adj. \angle s on a str. line = 180°

Page 213 cont...

18. $i = 109^\circ$,
Int. \angle s of a quad. = 360°
19. $j = 80^\circ$,
Int. \angle s of a quad. = 360°
 $k = 100^\circ$
Adj. \angle s on a str. line = 180°
20. $m = 88^\circ$,
Corres. \angle s are = // lines
 $n = 88^\circ$,
Vert. opp. \angle s are =
21. $p = 71^\circ$,
Vert. opp. \angle s are =
 $q = 71^\circ$,
Alt. \angle s are = // lines
 $r = 71^\circ$,
Alt. \angle s are = // lines
22. $s = 116^\circ$,
Co-int. \angle s sum to 180° , // lines
 $t = 123^\circ$,
Co-int. \angle s sum to 180° , // lines
 $u = 59^\circ$,
Int. \angle s of a $\triangle = 180^\circ$

Page 214

23. $v = 47^\circ$,
Alt. \angle s are = // lines
 $w = 107^\circ$,
Adj. \angle s on a str. line = 180°
 $x = 26^\circ$,
Alt. \angle s are = // lines
24. $a = 102^\circ$,
Vert. opp. \angle s are =
 $b = 78^\circ$,
Adj. \angle s on a str. line = 180°
 $c = 68^\circ$,
Int. \angle s of a $\triangle = 180^\circ$
25. $d = 121^\circ$,
Co-int. \angle s sum to 180° , // lines
 $e = 59^\circ$,
Adj. \angle s on a str. line = 180°
 $f = 90^\circ$,
Int. \angle s of a quad. = 360°
26. $g = 44^\circ$,
Int. \angle s of a $\triangle = 180^\circ$
 $h = 45^\circ$,
Int. \angle s of a $\triangle = 180^\circ$
27. $i = 67^\circ$,
Adj. \angle s on a str. line = 180°

Page 214 cont...

28. $k = 52^\circ$,
Co-int. \angle s sum to 180° , // lines
 $m = 52^\circ$,
Adj. \angle s on a str. line = 180°
29. $n = 41^\circ$,
Alt. \angle s are = // lines
 $p = 54^\circ$,
Alt. \angle s are = // lines
 $q = 85^\circ$,
Adj. \angle s on a str. line = 180°

Page 216

30. $a = 56^\circ$,
Base. \angle s isos. $\triangle =$
 $b = 124^\circ$,
Adj. \angle s on a str. line = 180°
 $c = 56^\circ$
Vert. opp. \angle s are =
31. $d = 60^\circ$,
Adj. \angle s on a str. line = 180°
 $e = 60^\circ$,
 \angle s at a pt = 360°
 $f = 60^\circ$,
 \angle s in an equil. $\triangle = 60^\circ$

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32. $g = 60^\circ$,
 \angle s in an equil. $\triangle = 60^\circ$
 $h = 120^\circ$,
Adj. \angle s on a str. line = 180°
 $i = 30^\circ$
Base. \angle s isos. $\triangle =$
33. $j = 18^\circ$,
Int. \angle s of a $\triangle = 180^\circ$
 $k = 324^\circ$,
 \angle s at a pt = 360°
34. $m = 45^\circ$,
Ext. \angle s of a poly. = 360°
 $n = 135^\circ$,
Adj. \angle s on a str. line = 180°
 $p = 45^\circ$
 \angle s at a pt = 360°
 $q = 67.5^\circ$
Base. \angle s isos. $\triangle =$
35. $r = 151^\circ$,
Adj. \angle s on a str. line = 180°
 s and $t = 14.5^\circ$,
Base. \angle s isos. $\triangle =$

Page 217 cont...

36. $u = 121^\circ$,
 Ext. \angle of a $\triangle = 2$ opp. int. \angle s
 $v = 48^\circ$,
 Alt. \angle s are $= //$ lines
 $w = 59^\circ$
 Corres. \angle s are $= //$ lines
37. $x = 78^\circ$,
 Int. \angle s of a $\triangle = 180^\circ$
 $y = 30^\circ$,
 Int. \angle s of a $\triangle = 180^\circ$
 $z = 75^\circ$,
 Adj. \angle s on a str. line $= 180^\circ$

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38. $a = 45^\circ$,
 Ext \angle s of a regular octagon
 $b = 135^\circ$,
 Int. \angle s of a regular octagon
 $c = 90^\circ$
 \angle s at a pt $= 360^\circ$
 $d = 225^\circ$
 \angle s at a pt $= 360^\circ$
39. $e = 144^\circ$,
 \angle s at a pt $= 360^\circ$
 $f = 252^\circ$,
 \angle s at a pt $= 360^\circ$
 $g = 54^\circ$,
 Int. \angle s of a $\triangle = 180^\circ$
40. $h = 95^\circ$,
 Int. \angle s of a hexagon $= 720^\circ$
 $i = 62^\circ$,
 Adj. \angle s on a str. line $= 180^\circ$
 $j = 223^\circ$
 \angle s at a pt $= 360^\circ$
41. $k = 120^\circ$,
 Int. \angle s of a regular hexagon
 $m = 60^\circ$,
 Adj. \angle s on a str. line $= 180^\circ$
 $n = 60^\circ$,
 \angle s of an equilateral triangle
42. $p = 36^\circ$,
 \angle s at a pt $= 360^\circ$
 $q = 108^\circ$,
 \angle s at a pt $= 360^\circ$
 $r = 144^\circ$
 Int. \angle s of a regular decagon
 $s = 36^\circ$
 Ext \angle s of a regular decagon
 $t = 216^\circ$
 \angle s at a pt $= 360^\circ$

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43. 1800°
 44. 140°
 45. 10 sides
 46. 6 sides
 47. 18°
 48. 156°
 49. 20 sides
 50. 8 sides
 51. 360 is not divisible by 28
 52. 360 is not divisible by 46
 53. a) 24 sides
 b) 165°
 c) 360°
54. a) 30 sides
 b) 168°
 c) 360°

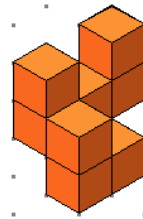
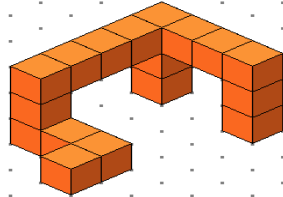
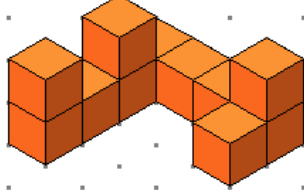
Page 221

55. $a = 63^\circ$
 Alt. \angle s are $= //$ lines
 $b = 90^\circ$
 Adj. \angle s on a str. line $= 180^\circ$
 $c = 27^\circ$
 Int. \angle s of a $\triangle = 180^\circ$
 $d = 111^\circ$
 Vert. opp. \angle s are =
 $e = 69^\circ$
 Adj. \angle s on a str. line $= 180^\circ$
 $f = 71^\circ$
 Int. \angle s of a $\triangle = 180^\circ$
 $g = 56^\circ$
 Base. \angle s isos. $\triangle =$
 $h = 68^\circ$
 Int. \angle s of a $\triangle = 180^\circ$
 Vert. opp. \angle s are =
 $i = 56^\circ$
 Alt. \angle s are $= //$ lines
 $k = 108^\circ$
 \angle s at a pt $= 360^\circ$
 $m = 36^\circ$
 Ext \angle s of a regular decagon
 $n = 144^\circ$
 Int \angle of a regular decagon
 $p = 216^\circ$
 \angle s at a pt $= 360^\circ$
 $q = 73^\circ$
 Base. \angle s isos. $\triangle =$
 $r = 34^\circ$
 Alt. \angle s are $= //$ lines

Page 221 cont...

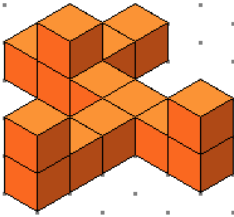
- $s = 56^\circ$
 Int. \angle s of a $\triangle = 180^\circ$
- Page 222
56. $x = 40^\circ$
 Adj. \angle s on a str. line $= 180^\circ$
57. $x = 30^\circ$
 Int. \angle s of a $\triangle = 180^\circ$
 $y = 330^\circ$
 \angle s at a pt $= 360^\circ$
58. $x = 57^\circ$
 \angle s at a pt $= 360^\circ$
59. $x = 68^\circ$
 Int. \angle s of a $\triangle = 180^\circ$
60. $x = 70^\circ$
 Co-int. \angle s sum to 180° , $//$ lines
 $y = 40^\circ$
 Alt. \angle s are $= //$ lines
61. $x = 19^\circ$
 Int. \angle s of a quad. $= 360^\circ$
 $y = 106^\circ$
 Adj. \angle s on a str. line $= 180^\circ$
62. $x = 37^\circ$
 Int. \angle s of a pentagon

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63. 
64. 
65. 

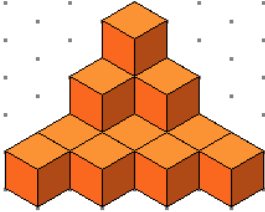
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66.

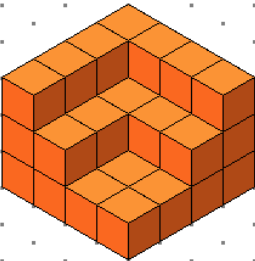


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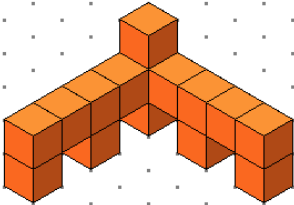
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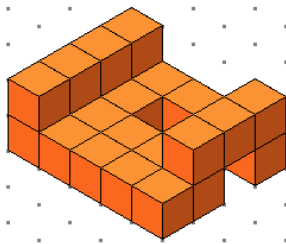
68.



69.

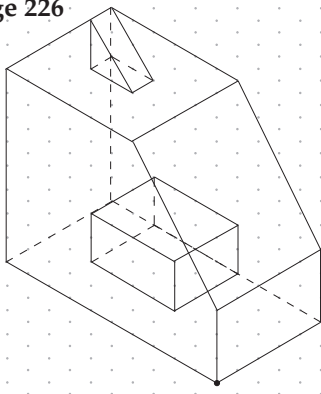


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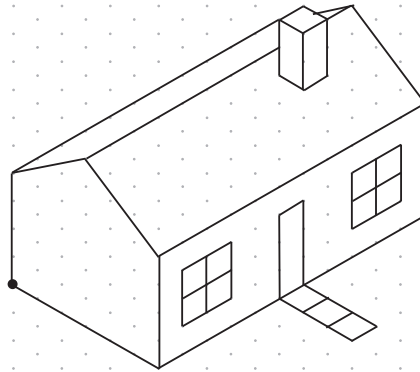
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71.



Page 227

72.



Page 229

73.

3	2	2	1	1
2	1			
1				

74.

4	1	
3		
2		
2	1	3

75.

0 or 1 or 2	2			
5	3	2	1	
1				1
2				

76.

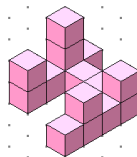
3	2	2	1
2			
2			
1			

77.

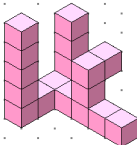
5				
2				
3	2	3	1	
4				1
1				1

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78.

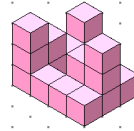


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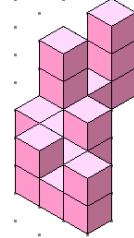


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80.

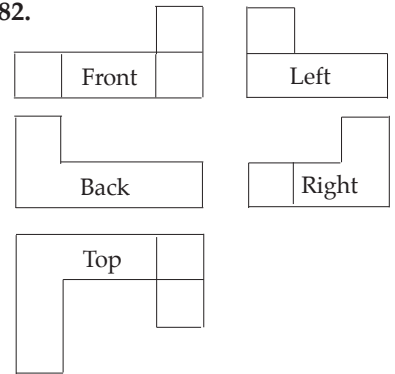


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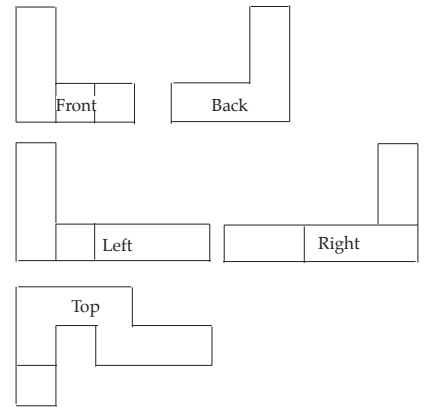


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82.

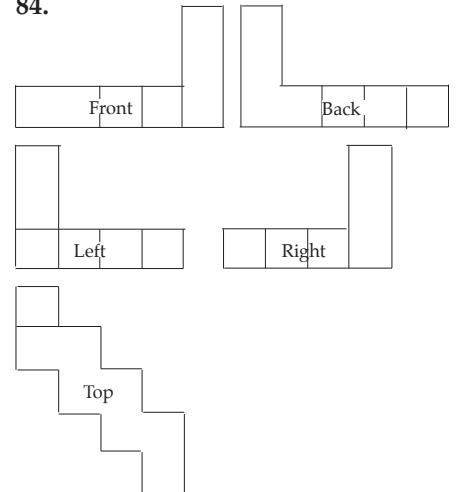


83.



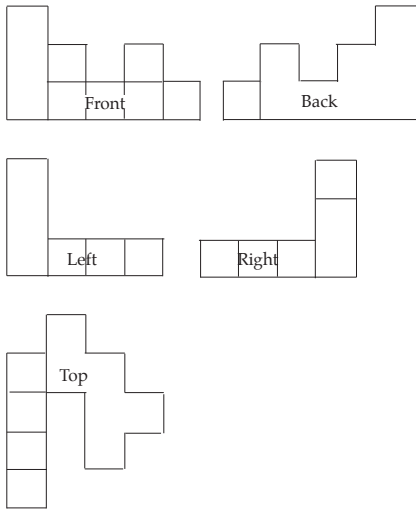
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84.



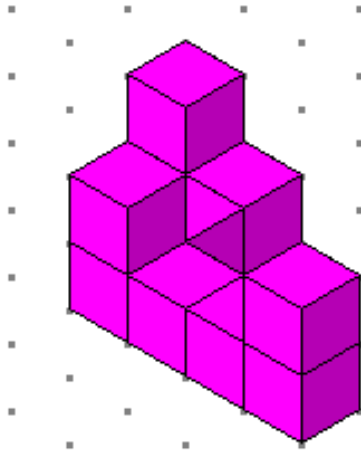
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85.



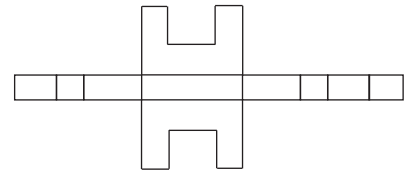
Page 235 cont...

89.



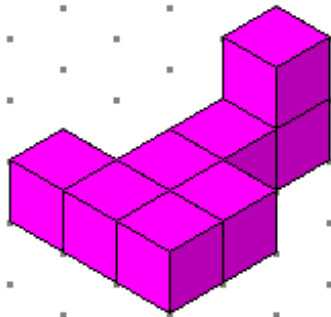
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94.



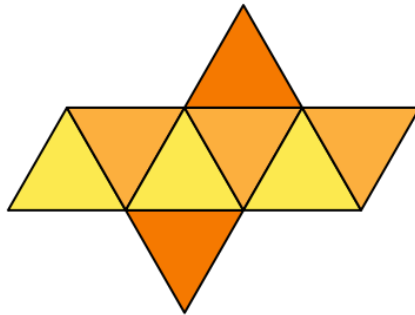
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86.

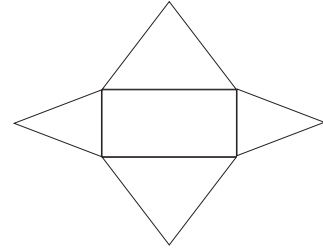


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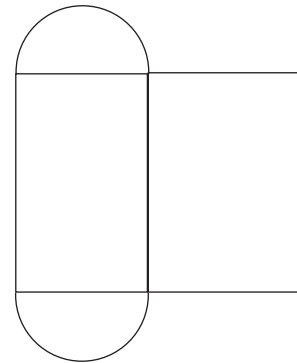
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95.

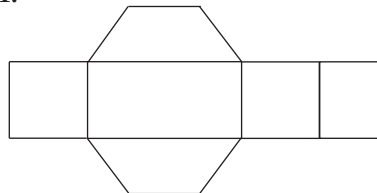


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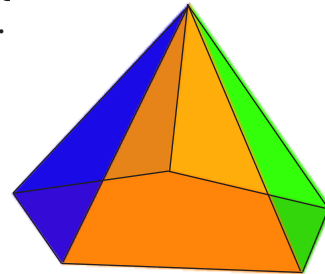
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91.

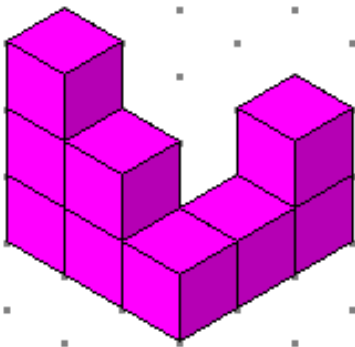


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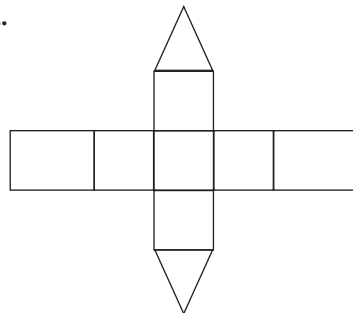
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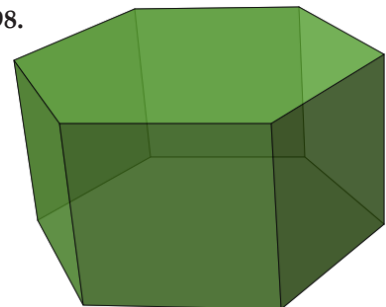
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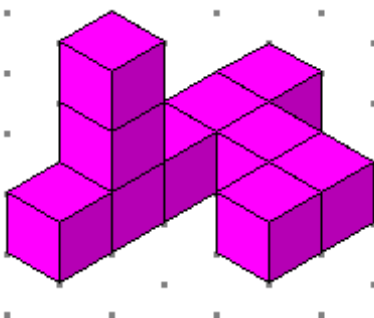


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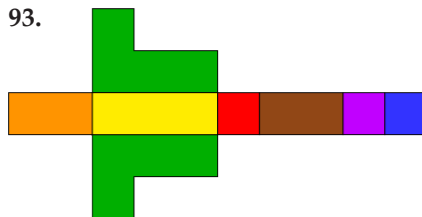


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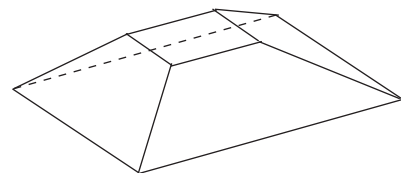
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93.

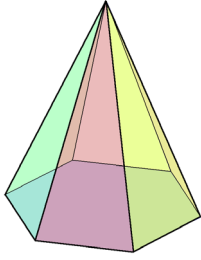


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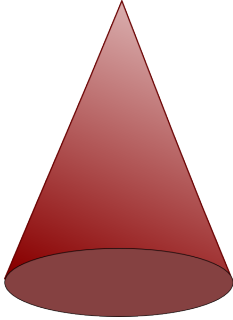


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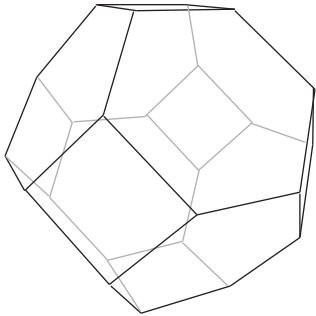
100.



101.

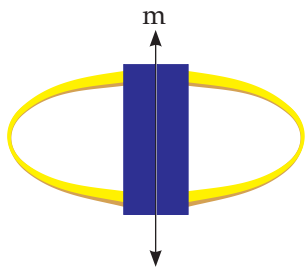


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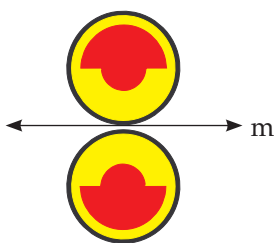


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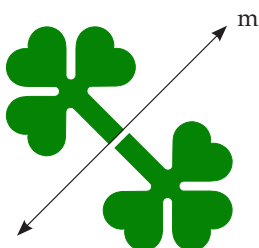
103.



104.

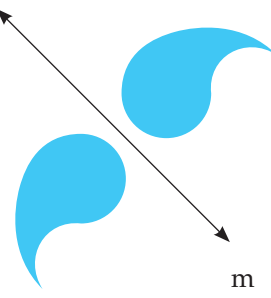


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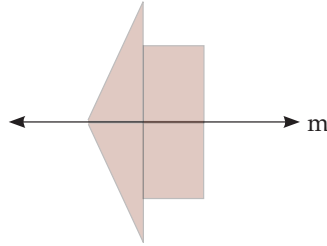


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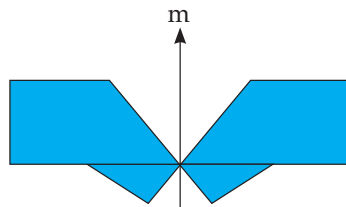
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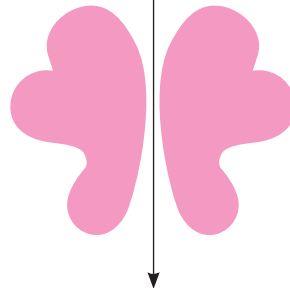
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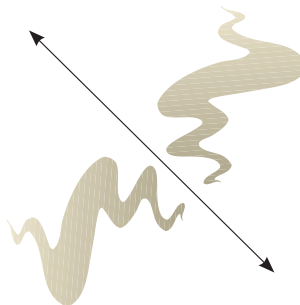
108.



109.

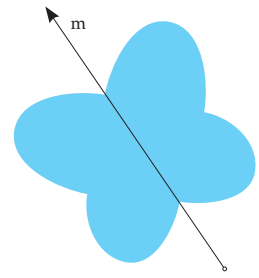


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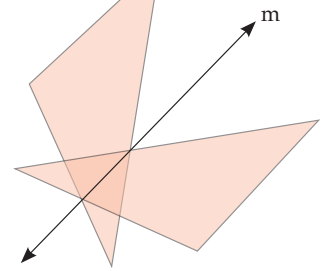


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111.

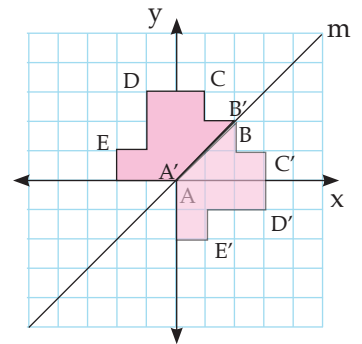


112.

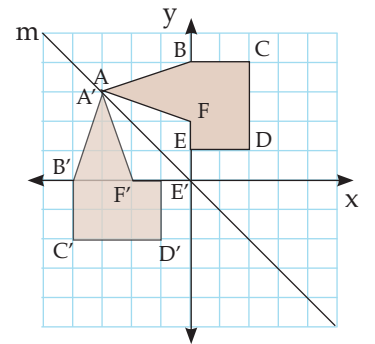


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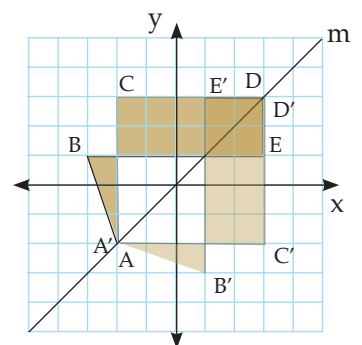
113.



114.

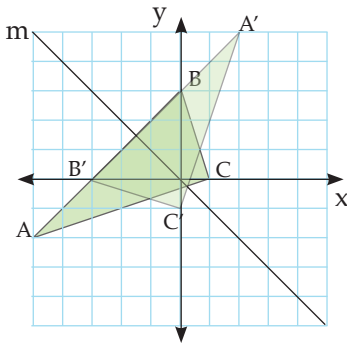


115.



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116.



117. a) $A'(0, 0)$
 b) $B'(5, 2)$
 c) $C'(0, 4)$
 d) $y = -x + 3$
 e) (1, 2). All points on the mirror line.

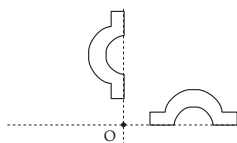
118. a) $A'(2, 2)$
 b) $B'(1, -5)$
 c) $C'(-1, 3)$
 d) $y = x - 1$
 e) (1, 0). All points on the mirror line.

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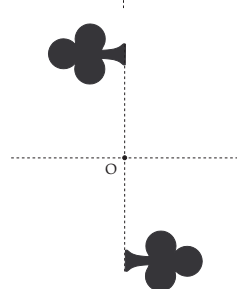
119. a) $A'(-1, 3)$
 b) $B'(-4, 5)$
 c) $C'(4, -1)$
 d) $D'(2, -6)$
 e) $y = 4$
 f) $y = x + 4$
120. a) $A'(0, 6)$
 b) $B'(2, 5)$
 c) $C'(7, 6)$
 d) $D'(5, 1)$
 e) $y = -x + 1$

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121.

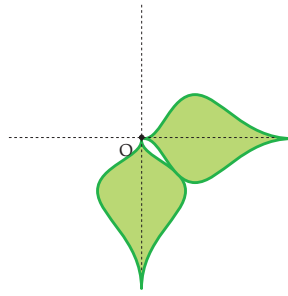


122.

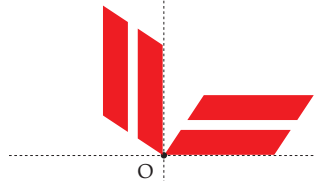


Page 250 cont...

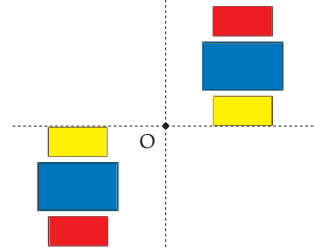
123.



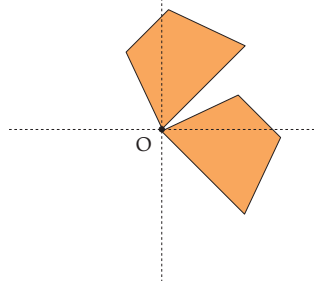
124.



125.

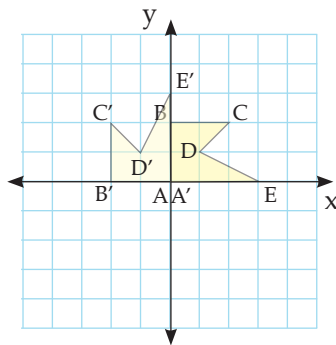


126.



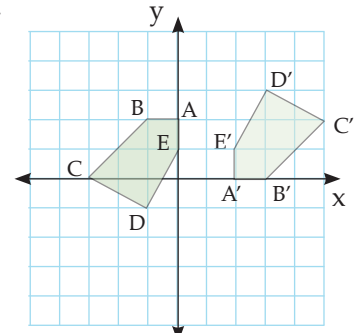
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127.

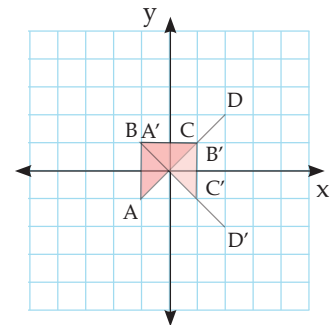


Page 251 cont...

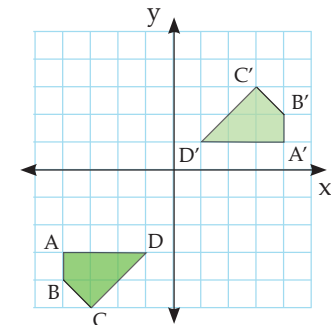
128.



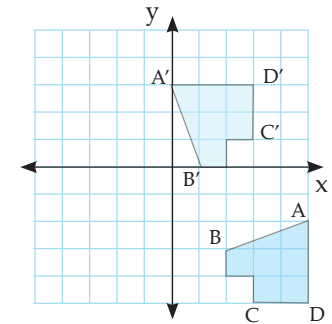
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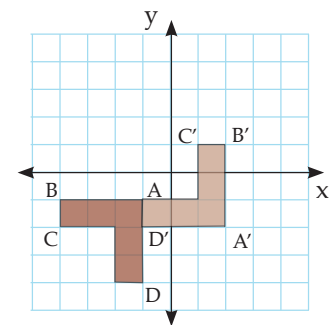
130.



131.

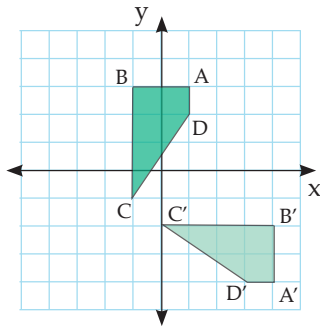


132.

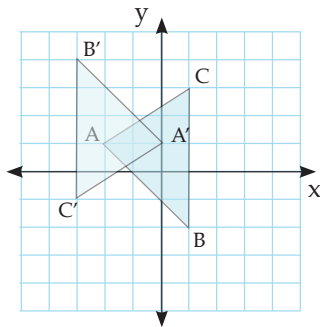


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133.



134.



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135. a) (-2, 0)

b) (-1, 3)

c) (-3, 2)

136. a) (4, 1)

b) (-1, -3)

c) (4, -1)

137. Rotation of 270° about O.

138. Rotation of 135° about O.

139. Rotation of 45° about O.

140. Rotation of 270° about O.

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141. Rotation of 270° about (-2, 2).

142. Rotation of 180° about (0, 0).

143. Rotation of 270° about (1, -4).

144. Rotation of 90° about (1, 0).

145. Rotation of 180° about (1, -2).

146. Rotation of 270° about (-1, 0).

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147. Axes of symmetry = 0

Rotational symmetry = 3

Total symmetry = 3

148. Axes of symmetry = 4

Rotational symmetry = 4

Total symmetry = 8

149. Axes of symmetry = 1

Rotational symmetry = 1

Total symmetry = 2

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150. Axes of symmetry = 2

Rotational symmetry = 2

Total symmetry = 4

151. Axes of symmetry = 0

Rotational symmetry = 1

Total symmetry = 1

152. Axes of symmetry = 0

Rotational symmetry = 4

Total symmetry = 4

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153. Axes of symmetry = 2

Rotational symmetry = 2

Total symmetry = 4

154. Axes of symmetry = 0

Rotational symmetry = 4

Total symmetry = 4

155. Axes of symmetry = 16

Rotational symmetry = 16

Total symmetry = 32

156. Axes of symmetry = 3

Rotational symmetry = 3

Total symmetry = 6

157. Axes of symmetry = 2

Rotational symmetry = 2

Total symmetry = 4

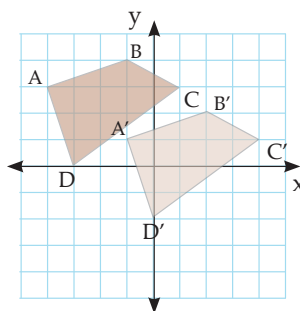
158. Axes of symmetry = 3

Rotational symmetry = 3

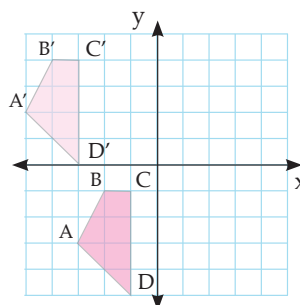
Total symmetry = 6

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159.

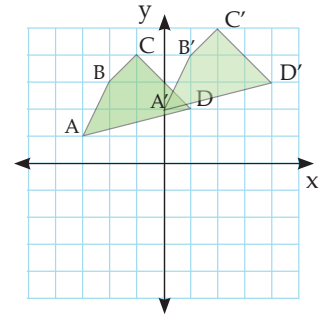


160.

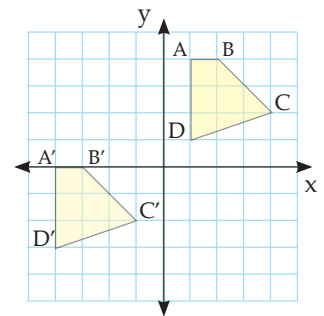


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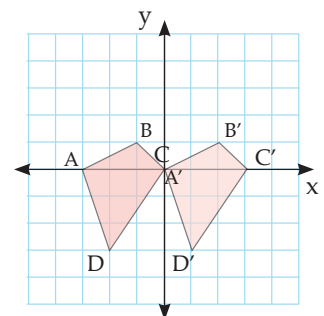
161.



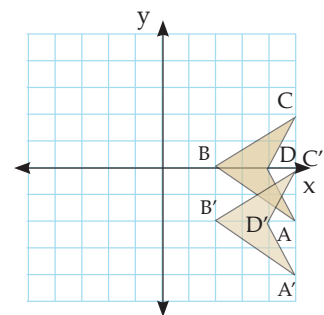
162.



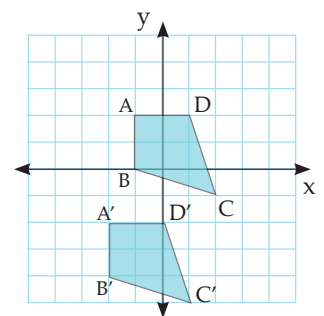
163.



164.

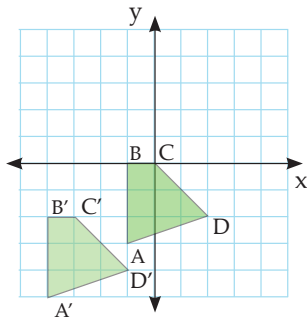


165.



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166.



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167. ABCD translated by the

$$\text{vector} \begin{pmatrix} 2 \\ 4 \end{pmatrix}$$

168. ABCD translated by the

$$\text{vector} \begin{pmatrix} -1 \\ -3 \end{pmatrix}$$

169. ABCD translated by the

$$\text{vector} \begin{pmatrix} 5 \\ -3 \end{pmatrix}$$

170. ABCD translated by the

$$\text{vector} \begin{pmatrix} 0 \\ -5 \end{pmatrix}$$

171. ABCD translated by the

$$\text{vector} \begin{pmatrix} -3 \\ -2 \end{pmatrix}$$

172. ABCD translated by the

$$\text{vector} \begin{pmatrix} -3 \\ 1 \end{pmatrix}$$

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173. $\begin{pmatrix} 2 \\ -4 \end{pmatrix}$

174. $\begin{pmatrix} -4 \\ -4 \end{pmatrix}$

175. $\begin{pmatrix} 3 \\ 7 \end{pmatrix}$

176. $\begin{pmatrix} 2 \\ -9 \end{pmatrix}$

177. $\begin{pmatrix} -6 \\ -6 \end{pmatrix}$

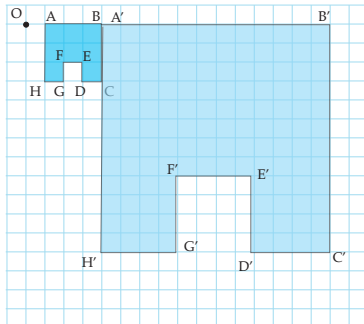
178. Take each component of the original point in turn and ask what value is required to make it equal to the corresponding component of the image point. The resulting values are the translation vector.

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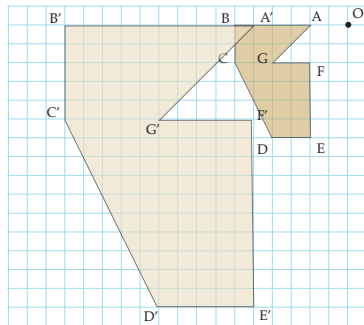
179. c) and f)

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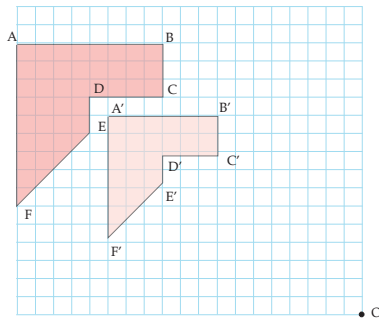
180.



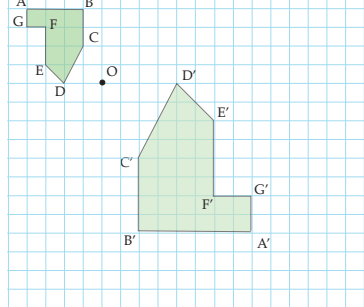
181.



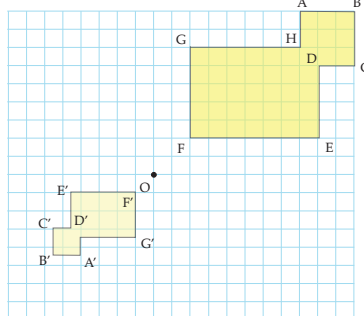
182.



183.

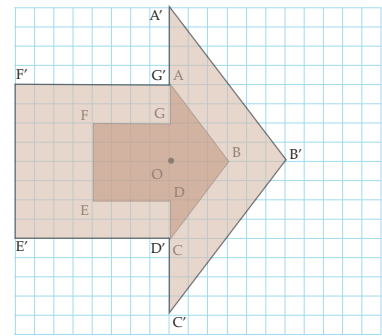


184.



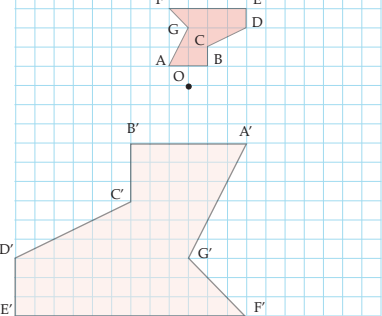
Page 269 cont...

185.

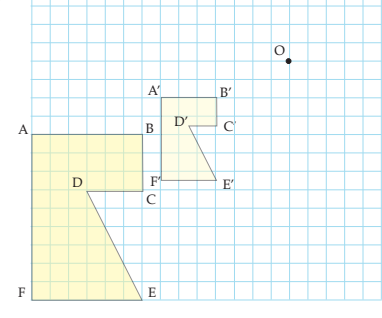


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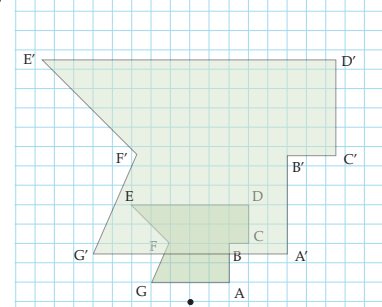
186.



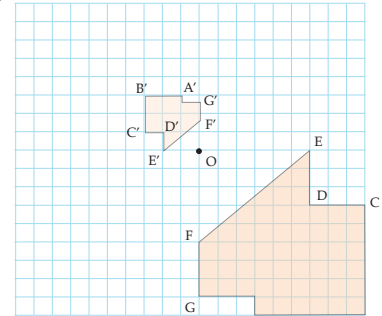
187.



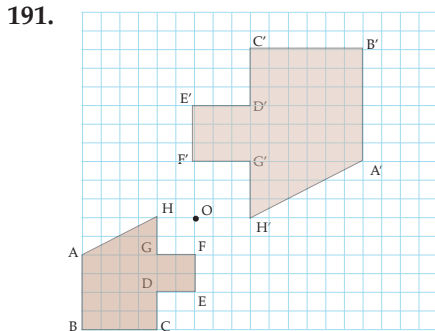
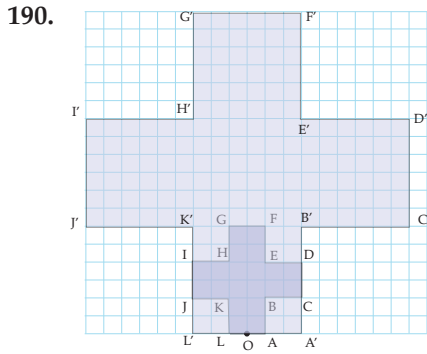
188.



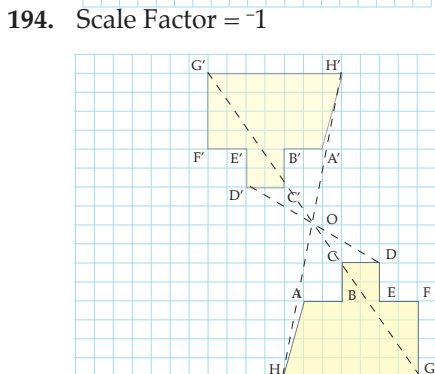
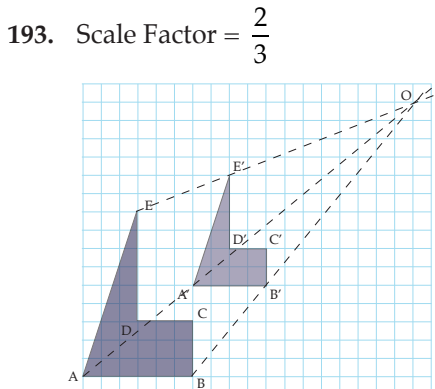
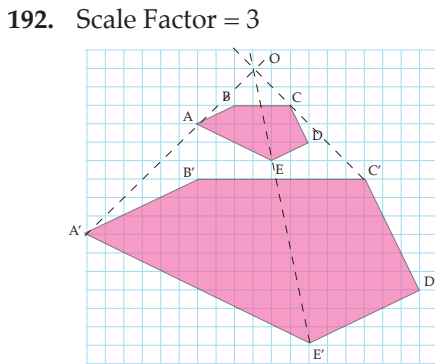
189.



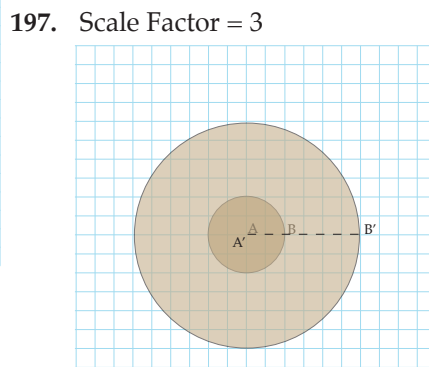
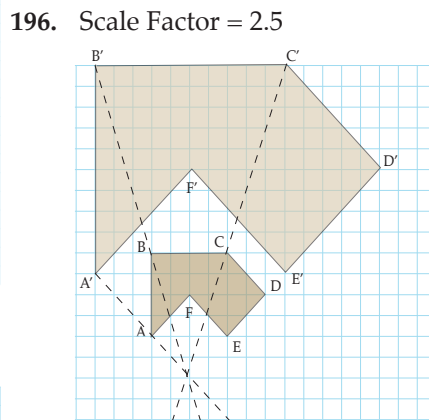
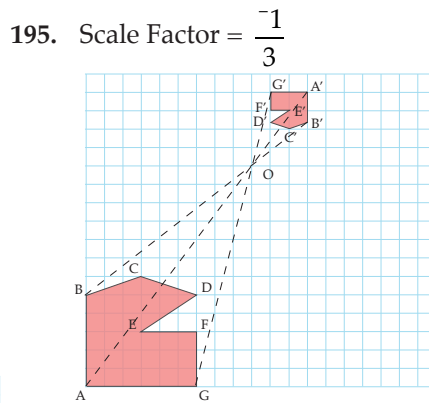
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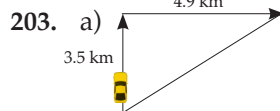
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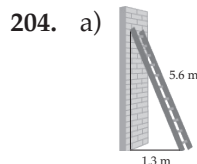
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- 198. $v = 34.0$ m (1 dp)
- 199. $w = 17.8$ cm (1 dp)
- 200. $x = 6.7$ m (1 dp)
- 201. $y = 9.0$ km (1 dp)
- 202. height = 5.7 cm (1 dp)

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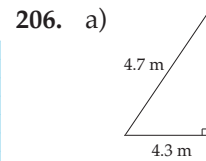
- b) 6.0 km (1 dp)



- b) 5.4 m (1 dp)

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- 205. 32.2 cm (1 dp)



- b) 1.9 m (1 dp)

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- 207. $x = 4.8$ m (1 dp)
- 208. $y = 6.9$ cm (1 dp)
- 209. $z = 22.6$ cm (1 dp)
- 210. $u = 29.4$ m (1 dp)
- 211. $v = 23.9$ m (1 dp)
- $w = 112.5$ m (1 dp)

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- 212. $x = 0.3$ km (1 dp)
- 213. $y = 30.2$ cm (1 dp)
- 214. $z = 9.1$ m (1 dp)

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- 215. $q = 19.9$ km (1 dp)
- 216. $r = 27.8$ cm (1 dp)
- 217. $s = 24.1$ m (1 dp)
- 218. $t = 36.8$ km (1 dp)
- 219. $u = 7.9$ m (1 dp)
- $v = 10.1$ m (1 dp)

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- 220. 16.2 m (1 dp)
- 221. 14.7 m (1 dp)
- 222. 72.9 m (1 dp)
- 223. 6.7 m (1 dp)
- 224. 1.1 km (1 dp)

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- 225. 33 m (2 sf)
- 226. 67 m (2 sf)
- 227. 1.8 m (1 dp)
- 228. 21.2 m (1 dp)
- 229. 44.6 m (1 dp)

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- 230. $A = 38.1^\circ$ (1 dp)
- 231. $B = 67.6^\circ$ (1 dp)
- 232. $C = 33.2^\circ$ (1 dp)

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- 233. $D = 24.1^\circ$ (1 dp)
- 234. $E = 50.4^\circ$ (1 dp)
- 235. $F = 27.3^\circ$ (1 dp)
- 236. $G = 55.0^\circ$ (1 dp)
- 237. $H = 42.4^\circ$ (1 dp)
- $I = 47.6^\circ$ (1 dp)

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238. 27.2° (1 dp)
 239. 36.3° (1 dp)
 240. 43.5° (1 dp)
 241. 66.8° (1 dp)
 242. 35.7° (1 dp)

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243. 66.1° (1 dp)
 244. 4.6° (1 dp)
 245. 15.8° (1 dp)
 246. 71.2° (1 dp)
 247. 24.9° (1 dp)

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248. Palais Royal Musée du Louvre
 249. Arc de Triomphe
 250. 5979
 251. 5381
 252. 534782
 253. 500772
 254. Belleville
 255. Richard Lenoir
 256. 3.0 – 3.2 km
 257. 5.0 – 5.5 km
 258. 0.20 – 0.25 km²
 259. 36 – 40 km²

Page 296

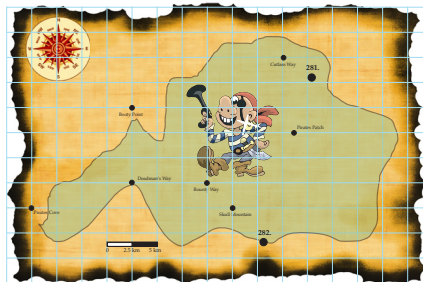
260. 198374
 261. 222344
 262. Skull Cave
 263. Shipwreck Island
 264. 246344
 265. 194358
 266. 4 km \pm 0.2
 267. 5.1 km \pm 0.2
 268. 1 km²
 269. 0.04 km²
 270. $28 \times 0.04 = 1.12$ km² by counting squares
 271. Approximately 22 complete 4 digit grid squares of 1 km² and counting part 4 digit grid squares around the coast adds 8 to 9 more giving a total of 30 to 31 so approximate area is 30 – 31 km².

Page 300

272. a) N26°E
 b) 026°
 273. a) S38°W
 b) 218°
 274. a) N69°E, 069°
 b) S43°E, 137°
 c) S59°W, 239°
 d) N21°W, 339°
 275. 334°, N26°W
 276. 038°, N38°E

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277. W, 270°
 278. S, 180°
 279. S45°W, 225°
 280. N45°W, 315°
 281. and 282.



283. a) 059°
 b) N59°E
 284. a) 198°
 b) S18°W
 285. a) 5 km
 b) 8.7 km

Topic 5
Statistics

Page 306

1. mean = 43.5 (1 dp)
median = 40.5
mode = 35
2. mean = 5.58 (2 dp)
median = 5.57
mode = 5.57 and 5.64
3. mean = 48.8 (1 dp)
median = 47.5
mode = 56
4. mean = 9.2 (1 dp)
median = 9.55
mode = 8.5
5. 40 over:
mean = 25.1 (1 dp)
median = 27
mode = 27
twenty20:
mean = 30.3 (1 dp)
median = 34
mode = 22
Based on the measures of centrality Tony's performance in the twenty20 games was better because his mean and median scores were both higher.

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6. median = 40.5
LQ = 30.5, UQ = 57, IQR = 26.5
Range = 66
7. median = 5.57
LQ = 4.53, UQ = 6.515,
IQR = 1.985, Range = 4.76
8. median = 43
LQ = 32, UQ = 59, IQR = 27
Range = 77
9. median = 9.9
LQ = 8.5, UQ = 10.6, IQR = 2.1
Range = 9.3
10. median = 390
LQ = 182, UQ = 774, IQR = 592
Range = 857
11. median = 5.65
LQ = 3, UQ = 7.6, IQR = 4.6
Range = 11.4
12. median = 32.5
LQ = 31.3, UQ = 34.4, IQR = 3.1
Range = 6.2

Page 309 Q12 cont...

- Anthea's swim times for 50 metres freestyle have a range of 6.2 seconds and a median time of 32.5 seconds. 25% of her swim times for the season were less than 34.4 seconds (UQ).
13. median = 3
LQ = 1, UQ = 6, IQR = 5
Range = 32
Median days absent for the term was 3. The middle 50% of the class had between 1 and 6 days absent. 25% of the class had 1 day or less absent in the term (LQ).

14. 40 over:
median = 27,
LQ = 18, UQ = 31, IQR = 13,
range = 56
twenty20:
median = 34,
LQ = 22, UQ = 40, IQR = 18,
range = 53
Tony's median was higher in the twenty20 games, 34 compared to 27 and his median in the twenty20 games was higher than his UQ in the 40 over games. Overall better in twenty20 games.

15. Home:
median = 15,
LQ = 14, UQ = 17, IQR = 3,
range = 8
School:
median = 13,
LQ = 11.5, UQ = 16, IQR = 4.5,
range = 15
Test performance at home is greater than that at school reflected by a difference in median of 2. Consistently better results at home, IQR of 3 compared to 4.5 and a lot smaller range 8 compared to 15.

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16. a) mean = 3.9 (1 dp)
median = 4, mode = 2, LQ = 2
UQ = 6, IQR = 4.
b) Mean number of sales per day is 4 (mean and median close). 50% of the days in the month the dealership sells between 2 and 6 cars (IQR). 25% of the days in the month the dealership sells 6 or more cars.

Page 312 cont...

17. a) mean = 4.3 (1 dp)
median = 4.5, mode = 4.5,
LQ = 3.5, UQ = 5.5, IQR = 2
b) Mean duration of calls per day is 4.3 minutes compared to a median of 4.5 minutes. 25% of calls have a duration of 3.5 minutes or less (LQ) while 25% of calls have a duration of 5.5 minutes or more (UQ). Mode is useful here as most calls last between 4 and 5 minutes (modal interval).

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18. a)

Weights (kg)	Tally	Midpoint (x)	Frequency (f)
145 - < 150		147.5	2
150 - < 155		152.5	4
155 - < 160		157.5	3
160 - < 165		162.5	3
165 - < 170		167.5	7
170 - < 175		172.5	4
175 - < 180		177.5	5
180 - < 185		182.5	3
185 - < 190		187.5	2
190 - < 195		192.5	1
TOTAL			34

- b) Mean 168.5 cm,
LQ = 157.5 cm,
median = 167.5 cm,
UQ = 177.5
- c) Mean 168.5 cm,
LQ = 159 cm,
median = 168.5 cm,
UQ = 177
If the intervals are not too large and there is a reasonable amount of data then there should not be a lot of difference between the two approaches.

19. a)

Level of Ni (ppm)	Tally	Midpoint (x)	Frequency (f)
0 - < 5		2.5	3
5 - < 10		7.5	2
10 - < 15		12.5	5
15 - < 20		17.5	8
20 - < 25		22.5	5
25 - < 30		27.5	7
30 - < 35		32.5	5
TOTAL			35

- b) Mean 19.8 ppm,
LQ = 12.5 ppm,
median = 17.5 ppm,
UQ = 27.5 ppm
- c) 0.14 (2 dp)
- d) Mean and median of the samples from the farm fall with the 15 – 25 range, but 63% of samples are either too low or too high.

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20. a) mean = 44.1 (1 dp)
 median = 44, mode = 44,
 LQ = 43, UQ = 45, IQR = 2

b)

Days to sprout	Tally	Frequency
40		4
41		7
42		8
43		9
44		5
45		4
46		2
47		1
48		0
49		0
50		0
TOTAL		40

- mean = 42.7 (1 dp)
 median = 43, mode = 43,
 LQ = 41, UQ = 44, IQR = 3

- c) Median days to sprout has dropped by a day (44 to 43) as a result of the phosphorous nutrient being added. 25% of bulbs now sprout before 41 days compared to 43 without phosphorous being added. Range has reduced by 3 from 10 to 7 indicating that adding phosphorous may reduce sprout times.

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21. a)

Temp (°C)	Midpoint (x)	Frequency Days - (f)
0 – < 2.5	1.25	4
2.5 – < 5.0	3.75	28
5.0 – < 7.5	6.25	33
7.5 – < 10.0	8.75	35
10.0 – < 12.5	11.25	27
12.5 – < 15.0	13.75	50
15.0 – < 17.5	16.25	42
17.5 – < 20.0	18.75	28
20.0 – < 22.5	21.25	44
22.5 – < 25.0	23.75	74
TOTAL		365

- b) 0.096 (3 dp)
 c) 32.3% (1 dp)
 d) $\frac{32}{365}$
 e) mean = 15.1 °C (1 dp)
 median = 16.25 °C,
 mode = 23.75 °C,
 LQ = 8.75 °C, UQ = 21.25 °C,
 IQR = 12.5 °C

Page 315 Q21 cont...

- f) 50% of the days during the year the high temperature is between 8.75 and 21.25 °C. Most common high temperature range is 22.5 – 25.0 °C (modal interval). 25% of the days in the year the high temperature is below 8.75 °C.

22. a) mean = \$707, median = \$675
 Median is a better estimator. The mean wage is affected by the small number of employees on a large wage whereas the median is not.

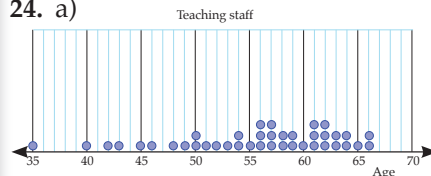
b) IQR = \$175

It is the wage range that the middle 50% of employees are on. The LQ is \$600 and the UQ is \$775, so 50% of the employees earn between these two values as their weekly wage.

Page 318

23. a) 26 students
 b) 2.1 (1 dp) siblings
 c) 52 parents, 26 students, 55 siblings. Total = 133
 d) Distribution of siblings is positively skewed and has a single peak (mode) at 2 siblings. No outliers are evident as 6 siblings is a realistic possibility.

24. a)



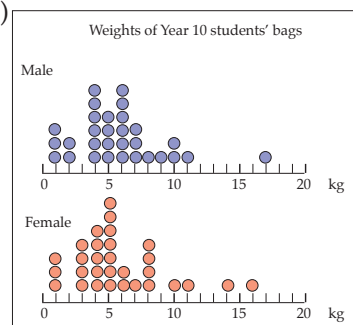
- b) Mean = 55.5 years (1 dp)
 Median = 57 years,
 LQ = 50.5 years,
 UQ = 61.5 years
 IQR = 11 years
 Range = 31 years
 Distribution appears to be negatively skewed with 75% of the teachers being over 50 years of age. 50% of the teachers at the school are between 50.5 and 61.5 years of age. No outliers as a teacher of 35 is realistic though stands out because

Page 318 Q24b) cont...

the staff are relatively old. Peak (mode) is at 61 years of age.

Page 319

25. a)



- b) Both male and female dot plots are positively skewed. Peak at 5 kg for females which is also their median weight carried while males median weight carried is 5.5 kg with peaks at 4 and 6 kg. Clusters of points from 4 to 6 kg for males and 3 to 5 kg for females. Little difference between the bag weight carried by males and females. IQR is smaller for males (3 kg) as opposed to 4 kg for females. For both males and females 75% of students carry a bag to school heavier than 4 kg.

26. More downtime during the day shift with a median of approximately 36.9 minutes compared to approximately 30.0 minutes for the night shift. Both distributions are symmetrical with single peaks (one mode). Similar number of downtimes for both night and day shifts, but the downtimes during the day shift are for longer durations.

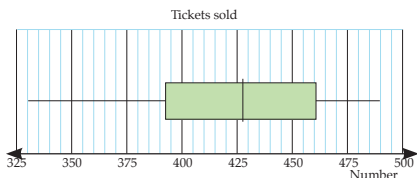
Page 322

27. a) Tastebuds Café with 170 customers
 b) Less range in the number of customers per day than Tastebuds Café, IQR = 25 and Range = 65 compared to IQR = 65 and Range = 135 for Tastebuds Café. More consistent numbers of daily customers for Café Connect and less variation compared

Page 322 Q27b) cont...

to Tastebuds Café.
Median number of customers per day is the same for both cafés.

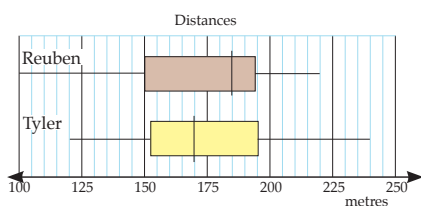
28. a)



b) Symmetrical distribution for ticket sales with a median of 428 tickets per show and an IQR of 68 tickets. 75% of the season had sales in excess of 393 (LQ) or more tickets.

29. a) Reuben
median = 185 m,
LQ = 150 m, UQ = 194.5 m,
Min = 100 m, Max = 220 m

Tyler
median = 170 m,
LQ = 152 m, UQ = 195 m,
Min = 120 m, Max = 240 m



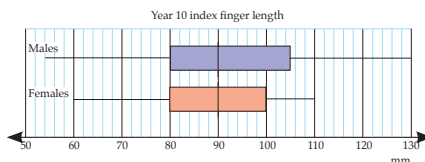
b) Reuben and Tyler have a similar IQR 44.5 m for Reuben and 43 m for Tyler however Reuben's median distance is 15 m more than Tyler's. Reuben's distribution of shots is negatively skewed and he has a cluster of distances in the 180 to 185 m range. Tyler's distribution of shots tends to be more positively skewed

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30. a)

	Year 10 students	
	Female	Male
Number	30	30
Median	90	90
LQ	80	80
UQ	100	105
IQR	20	25
Minimum	60	54
Maximum	110	130

Page 323 Q30 cont...



b) Little difference between the index finger length of Year 10 male and female students as both have the same median length of 90 mm. The distribution of female index finger lengths is symmetrical with a LQ of 80 mm and UQ of 100 mm. The UQ of male index finger length is 5 mm more than the females. The males have a greater range of index finger length compare to females (130 compared to 110 mm).

Page 326

31. a)

Malic acid g/L												
0	9											
1	1	2	2	3	4	4	5	5	6	7	8	8
2	1	3	3	4	6	7						
3	0	2	4	5	7							
4	1	7	7									
5	1											

b) median = 2.0 g/L,
LQ = 1.5 g/L,
UQ = 3.2 g/L,
IQR = 1.7 g/L,
Min = 0.9 g/L,
Max = 5.1 g/L

c) 0.47 (2dp)

d) The distribution of malic acid content in the sampled wines had a median of 2.0 g/L. The distribution is positively skewed with half the wines having a malic acid content of between 1.5 and 3.2 g/L (IQR).

32. a)

Pulse rate (bpm)												
	8	6	5	4	3	2	6					
	9	9	8	7	7	6	5	3	7	4	5	
			8	7	5	4	3	8	3	6	7	
							1	9	1	3	4	5
								10	2	5	5	6
								11	6	7		
							5	12	3	4	5	
								13	7	8		
								14	5			

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32. b)

	Year 10 students	
	Before	After
Mean	75.0 (1 dp)	103.4 (1 dp)
Median	76	105
LQ	63.5	89
UQ	83.5	120
IQR	20	31
Minimum	54	52
Maximum	125	145

c) 52 bpm after and 125 bpm before, look like they have been put in the wrong group and should be swapped over.

d)

	Year 10 students	
	Before	After
Mean	72.0 (1 dp)	106.4 (1 dp)
Median	75	105
LQ	62.5	92
UQ	81	123.5
IQR	18.5	31.5
Minimum	52	74
Maximum	91	145

e)

Pulse rate (bpm)												
	8	6	6	5	3	2	2	6				
	9	9	8	7	7	6	5	3	7	4	5	
			8	7	5	4	3	8	3	6	7	
							1	9	1	3	4	5
								10	2	5	5	6
								11	6	7		
								12	3	4	5	5
								13	7	8		
								14	5			

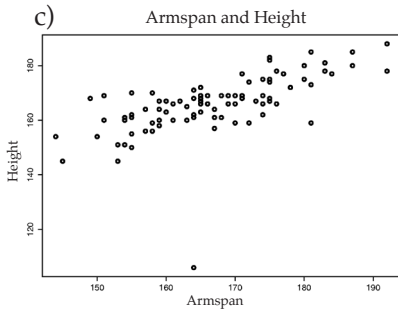
Revised stem and leaf plot above with two values swapped over, i.e. 125 and 52.

Significant difference between the two distributions. The effect of exercise has been to raise the median heart rate by 30 bpm.

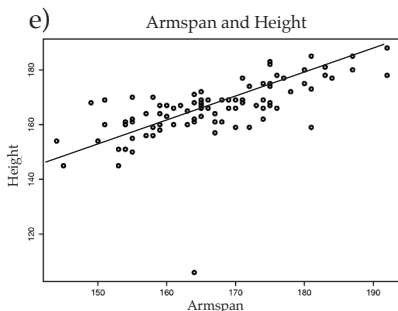
The distribution before exercise is symmetrical about a median of 75 bpm with a small IQR of only 18 bpm. The distribution after exercise is more spread out IQR now 31.5, but still symmetrical about its median of 105. Peaks occur in the 70 bpm range before exercise and in the 100 bpm range after exercise. The likely cause of the greater range of heart rates after exercise would be due to the different fitness levels of Year 10 students.

Page 331 (Authors' results)

- 33. a) Teacher marked
- b) Teacher marked
- c)



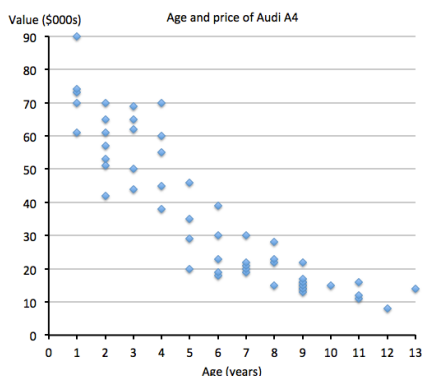
- d) (163, 105) appears to be an outlier in the authors' results. The point should be investigated further to see if it has been recorded correctly. If not it should be corrected otherwise left as is.



- f) Height range 150 to 170 cm.
- g) Strong positive relationship between armspan and height. In other words the greater a student's armspan width the taller they are.
- h) 170 cm

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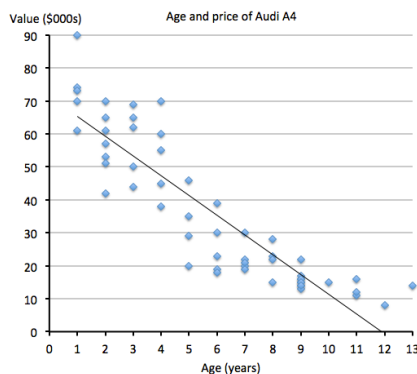
- 34. a)



- b) No real outliers. (1, \$90 000) is a little high but perhaps reflects an Audi A4 with lots of extras.

Page 332 Q34 cont...

- c) Range \$19 000 to \$39 000
- d) 5 to 7 years old.
- e)



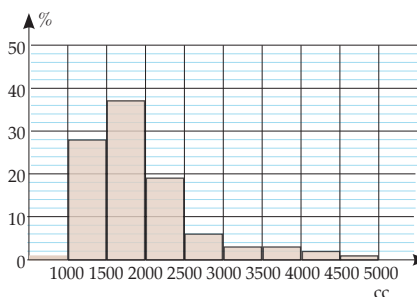
- f) \$11 000 to \$12 000

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- 34. g) Moderate negative relationship between age and price. In other words the older the car the lower its price.
- h) Rather than continuing to decrease the points flatten off because a car always has some value no matter how old it is.
- i) Because age is not the only factor in determining the value of a car. Mileage, condition, extras etc. all contribute to its value.
- 35. a) moderate positive relationship.
- b) strong negative relationship.
- c) no relationship.
- d) weak negative relationship.
- e) strong positive relationship with outliers.

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- 36. a)



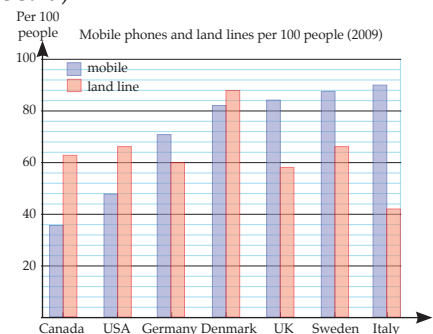
- b) 0.66
- c) 0.09

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- d) Increase in petrol prices has seen the demand for cars with greater engine sizes decrease.
- e) Increased demand for cars with engine sizes of 1000 – 2000 cc probably due to the increase in petrol prices over the period of 7 years. Cars in this range use less fuel. As a consequence there has been a reduction in demand for bigger engine cars (over 3000 cc).
- 37. a) Too fast for the conditions.
- b) Loss of control.
- c) Illness/Disability. Did not see other party. Failed to give way. Failed to keep left. Driver tired or fell asleep.
- d) Inattention or attention diverted, because when a driver texts they are distracted.
- e) Inexperienced at driving on the open road at a speed of 100 km/h.
- f) Likely to include when a driver has a heart attack while driving or epileptic fit or physical disability, e.g. visual impairment etc.

Page 339

- 38. a)



- b) Mobile phone use exceeds landline use in four of the five European countries. Italy has the lowest landline use and conversely the highest mobile phone use. Denmark has the highest landline use of all countries but still a

Page 339 Q38b cont...

high mobile phone use.

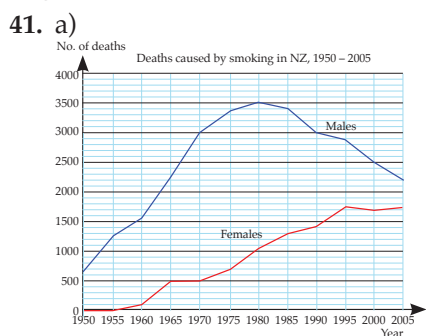
In 2009 landlines were more common in North America than cell phones. Mobile phone usage was the lowest in Canada of all countries.

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39. a) 11%
 b) 22.5%
 c) 3%
 d) 1993
 e) In 1980 obesity rates for males and females was 10% or less. These increased slowly until 1989 then increased more steeply until 1995. After 1995 male rates dropped for a period of three years while females continued to rise. Since 1999 rates have risen steeply for both sexes. Female obesity rates have always been a little higher than males, although in the years after 2005 males obesity rate is greater than that of females.

40. a) Social Welfare, Housing and Other assistance.
 b) 16%
 c) \$70.6 billion.

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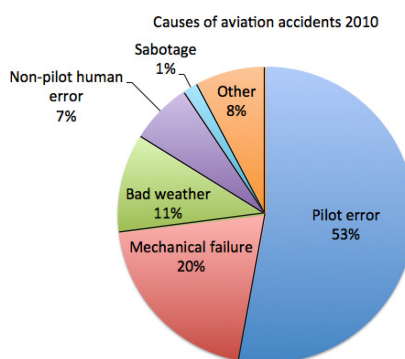
- b) Very few smokers were females or no data collected on females.
 c) 1980 for men and 1995 for women, because deaths from smoking since these respective years have decreased.
 d) Males show significantly more deaths from smoking than females indicating that a greater percentage of men

Page 344 Q41d cont...

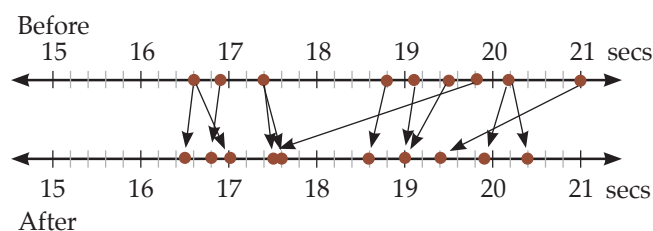
smoke. Peak number of deaths caused by smoking for men was reached in 1980 since then it has continued to fall, probably due to the government's initiatives to reduce smoking.

Females show a steady increase in deaths from smoking from 1960 even during the period when males deaths by smoking reduced. Female deaths caused by smoking has levelled off since 1995.

42.



43.



Eight out of the 12 students (67%) in the class showed an improvement after studying the unit on hurdling techniques.

Pages 350 – 354

Teacher marked.

Topic 6 Probability

Page 356

1. a) Results will vary.

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1. b) HH, HTH, THH, HTTH, HTTT, TTTT, TTTH, TTHT, TTHH, THTH, THTT.

Results will vary in c) and d) but expect

- c) approximately $\frac{1}{2}$ (0.5)
d) approximately $\frac{1}{4}$ (0.25)
2. a) H♦, H♣, H♠, H♥, T♦, T♣, T♠, T♥

- b) 100 times

- c) 49

- d) 23

e) $\frac{12}{100} \left(\frac{3}{25} \right)$

f) $\frac{24}{100} \left(\frac{6}{25} \right)$

g) Approximately $\frac{50}{400} \left(\frac{1}{8} \right)$

Eight possibilities all equally likely hence $\frac{1}{8}$.

3. a) Results will vary

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3. b) \$0, \$2, \$4, \$5

Results will vary in c), d), e) and f) but expect

c) approximately $\frac{1}{2}$ (0.5)

d) approximately $\frac{4}{30}$

- e) \$5 - \$18

- f) approximately \$300.

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4. a) $P(\text{blue}) = \frac{6}{15} \left(\frac{2}{5} \right)$

b) $P(\text{not yellow}) = \frac{11}{15}$

c) $P(\text{blue or yellow}) = \frac{10}{15} \left(\frac{2}{3} \right)$

d) $P(\text{red on second}) = \frac{4}{14} \left(\frac{2}{7} \right)$

5. a) $P(\text{club}) = \frac{13}{52} \left(\frac{1}{4} \right)$

b) $P(\text{black ace}) = \frac{2}{52} \left(\frac{1}{26} \right)$

Page 361 Q5 cont...

c) $P(\text{picture card}) = \frac{12}{52} \left(\frac{3}{13} \right)$

d) $P(\text{next king}) = \frac{3}{51} \left(\frac{1}{17} \right)$

6. a) M play in a school team,
F play in a school team,
M don't play in a school team,
F don't play in a school team

b) $P(F) = \frac{630}{1280} \left(\frac{63}{128} \right)$

c) $P(\text{play sports team}) = \frac{530}{1280} \left(\frac{53}{128} \right)$

d) $P(\text{male and not play}) = \frac{270}{1280} \left(\frac{27}{128} \right)$

7. a)

		Blue											
		1	2	3	4	5	6						
Red	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

b) $P(\text{red shows 5}) = \frac{5}{36}$

c) $P(\text{red} > \text{blue}) = \frac{15}{36} \left(\frac{5}{12} \right)$

d) $P(\text{difference} = 2) = \frac{8}{36} \left(\frac{2}{9} \right)$

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8. a) $P(J) = \frac{1}{10}$

b) $P(M) = 0$

c) $P(A, E, I) = \frac{3}{10}$

d) $P(H, A, T) = \frac{2}{10} \left(\frac{1}{5} \right)$

9. a) $P(\text{letter}) = \frac{30}{80} \left(\frac{3}{8} \right)$

b) $P(\text{square}) = \frac{25}{80} \left(\frac{5}{16} \right)$

c) $P(\text{circular with letter}) = \frac{20}{80} \left(\frac{1}{4} \right)$

d) $P(\text{not square not letter}) = \frac{35}{80} \left(\frac{7}{16} \right)$

Page 362 cont...

10. a)

	2	4	6	8
3	5	7	9	11
5	7	9	11	13
7	9	11	13	15
9	11	13	15	17

b) $P(E) = \frac{4}{16} \left(\frac{1}{4} \right)$

c) $P(E) = \frac{3}{16}$

d) $P(E) = \frac{3}{16}$

e) $P(E) = 0$

f) $P(E) = 1$

g) $P(E) = 0$

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11. a) $P(< 55) = \frac{420}{750} \left(\frac{14}{25} \right)$

b) $P(\text{heart attack}) = \frac{120}{750} \left(\frac{4}{25} \right)$

c) $P(< 55 \text{ and heart attack}) = \frac{25}{750} \left(\frac{1}{30} \right)$

d) $P(\text{older heart attack}) = \frac{95}{330} \left(\frac{19}{66} \right)$

12. a) 1120 students

b) $P(\text{mobile phone}) = \frac{1010}{1120} \left(\frac{101}{112} \right)$

c) $P(\text{School B}) = \frac{610}{1120} \left(\frac{61}{112} \right)$

d) $P(\text{School A no mobile phone}) = \frac{35}{1120} \left(\frac{1}{32} \right)$

e) $P(\text{School A not own}) = \frac{35}{510} \left(\frac{7}{102} \right)$

13. a) $P(\text{even}) = \frac{7}{15}$

b) $P(\text{odd divisible by 5}) = \frac{2}{15}$

c) $P(\text{between 3 and 6 inclusive}) = \frac{4}{15}$

14. a)

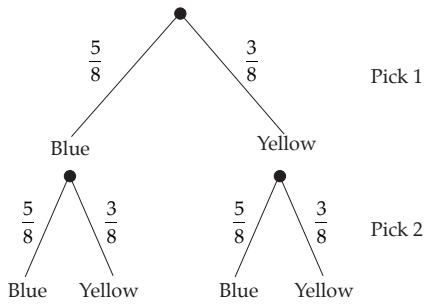
	B	R	R	G	G	G						
B	B	B	B	R	B	R	B	G	B	G	B	G
B	B	B	B	R	B	R	B	G	B	G	B	G
R	R	B	R	R	R	R	R	G	R	G	R	G
R	R	B	R	R	R	R	R	G	R	G	R	G
G	G	B	G	R	G	R	G	G	G	G	G	G
G	G	B	G	R	G	R	G	G	G	G	G	G

b) $P(\text{both red}) = \frac{4}{36} \left(\frac{1}{9} \right)$

c) $P(\text{at least one green}) = \frac{24}{36} \left(\frac{2}{3} \right)$

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15. a)

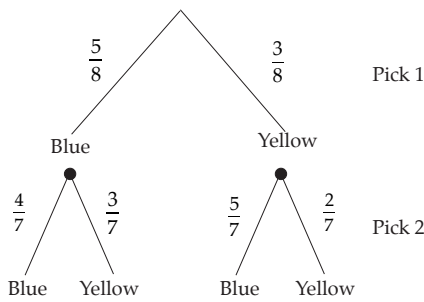


b) Blue Blue, Blue Yellow, Yellow Blue, Yellow Yellow.

c) $P(\text{yellow yellow}) = \frac{3}{8} \times \frac{3}{8} = \frac{9}{64}$

d) $P(\text{yellow blue, blue yellow}) = \left(\frac{3}{8} \times \frac{5}{8}\right) + \left(\frac{5}{8} \times \frac{3}{8}\right) = \frac{30}{64} \left(\frac{15}{32}\right)$

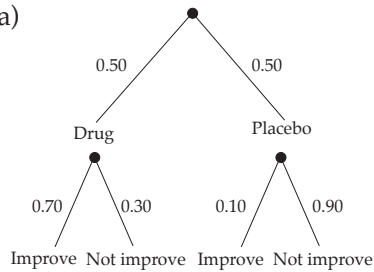
e)



f) $P(\text{yellow yellow}) = \frac{3}{8} \times \frac{2}{7} = \frac{6}{56} \left(\frac{3}{28}\right)$

Probability is more in Part c) above because there are 8 balls each time a draw is made whereas there is only 7 balls in the second draw in Part f).

16. a)

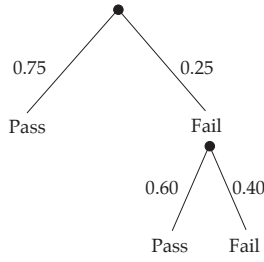


b) $P(\text{receives drug and improves}) = 0.50 \times 0.70 = 0.35$

c) $(0.35 + 0.05) \times 150 = 60$ people

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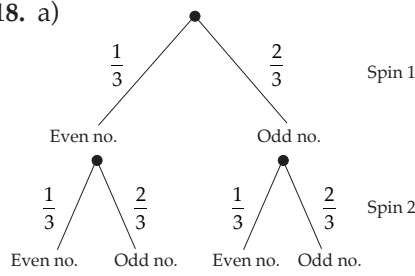
17. a)



b) $P(\text{FP}) = 0.25 \times 0.60 = 0.15$

c) $P(\text{Pass}) = 0.75 + 0.15 = 0.90$

18. a)

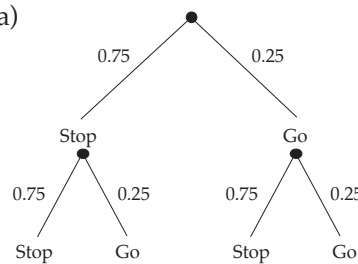


b) $P(\text{EO}) = \frac{2}{9}$

c) $P(\text{OO}) = \frac{4}{9}$

d) $P(\text{EE}) = \frac{1}{9}$

19. a)



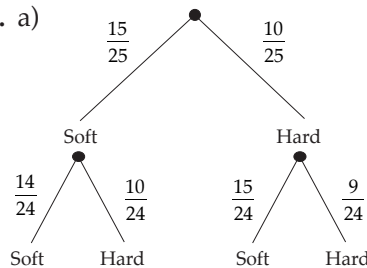
b) $P(\text{SS}) = 0.75 \times 0.75 = 0.5625$

c) $P(\text{SG, GS}) = (0.75 \times 0.25) + (0.25 \times 0.75) = 0.375$

d) $0.25 \times 0.25 \times 225 = 14$ or 15 times

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20. a)



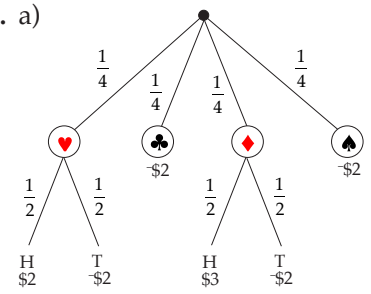
b) $\frac{15}{25} \times \frac{14}{24} = \frac{7}{20}$

c) $\frac{15}{25} \times \frac{10}{24} = \frac{1}{4}$

d) $\frac{15}{25} \times \frac{14}{24} \times \frac{13}{23} = \frac{91}{460} (0.198)$

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21. a)



b) ♥H, ♥T, ♦H, ♦T, ♣, ♠

c) $P(\$5) = \frac{1}{8}$

d) 12.5%

e) $\$1000 - \$250 - \$312.50 = \437.50

