Chapter 5 REAL NUMBERS

Do not use calculators unless stated otherwise.

1. If 10 km south is indicated by –10, how would you indicate 10 km north?

2. If +100 indicates a profit of $100, how would a loss of $91 be indicated?

3. If a deposit of $600 is represented by +600, how would you represent a withdrawal of $60?

4. If 5 flights down is represented by –5, how would you represent 14 flights up?

5. Write down the larger number in each case.
(i) –1, –2 **(ii)** –6, 6 **(iii)** –7, 3 **(iv)** 0, –3 **(v)** 1, –10

6. Write down the smaller number in each case.
(i) –30, 7 **(ii)** $\frac{-12}{2}$, –5 **(iii)** 0, $\frac{-4}{5}$ **(iv)** –1, 0 **(v)** –13, 12

Add the following.

7. (–2) + (–2)	**8.** (–5) + (–9)	**9.** (–11) + (–12)	**10.** (–1) + 1
11. (–7) + 3	**12.** 14 + (–9)	**13.** (–29) + 15	**14.** (–29) + (–15)
15. (–41) + (41)	**16.** 39 + (–33)	**17.** 0 + (–56)	**18.** (–56) + (–0)

19. An airplane descended 150 m from an altitude of 650 m and then ascended 830 m immediately. At what altitude was the airplane flying?

20. Beginning with a temperature of 24°C, the temperature rises by 8°C, then drops by 14°C and finally rises by 2°C. What is the temperature after the above changes?

Evaluate the following.

21. 5 – (–2)	**22.** (20) – (–8)	**23.** (–7) – (–17)	**24.** 14 – (–6)	**25.** –9 – 91
26. –95 – 5	**27.** –75 – 125	**28.** 7 – 27	**29.** 18 – 118	**30.** 35 – 100

Evaluate the following.

31. –18 + 10 + (–2)	**32.** –11 + 35 + (–89)	**33.** 28 + 22 + (–100)	**34.** 16 + (–18) – (–2)
35. 14 + 15 – 30	**36.** 35 – (–6) – 40	**37.** 17 – 20 – (–8)	**38.** –18 – (–10) + (–12)
39. –(–13) + 27 + (–20)	**40.** 37 + (–29) + (–18)	**41.** 26 – (15 – 9)	**42.** 47 – (–16 – 17)

Evaluate the following.

43. (–5 + 2) – (–13)
44. [–6 – (–16)] + (–15)
45. (–17) + [6 + (–9)]
46. 15 – (–3) – 14 + (–24)
47. 31 + (–1) + (–18) – (–28)
48. –54 + (–46) + (–100) – (–150) + (–1) – (–2) + (–11)
49. 39 + [–12 + (–26)] – (–99)
50. [–2 + (–3) + (–5)] + [10 – (–13) – (–7)] + (–1)
51. [–23 – (–18)] – [36 + (–41)]
52. –[–(–21) + (–27)] – [–66 – (–70)]

Evaluate the following.

53. 8 × (–5)	**54.** 15 × (–3)	**55.** –6 × 12
56. –11 × 9	**57.** –4 × (–16)	**58.** –7 × (–14)
59. (–1) × (–1) × (–1)	**60.** (–19) × (–3) × (–2)	**61.** (–25) × 4 × (–8)

62. $(-20) \times (-5) \times 9$ **63.** $15 \times (-4) \times (-3)$ **64.** $-12 \times 5 \times 7$

65. $8 \times (-5) \times 7$ **66.** $16 \times 2 \times (-10)$ **67.** $(-2) \times (-3) \times (-4) \times (-5)$

68. $(-5) \times (-4) \times (-12) \times 5$ **69.** $(-8) \times (-3) \times 5 \times (-6)$ **70.** $(-2) \times 5 \times (-9) \times (-7)$

71. $4 \times (-4) \times (-5) \times (-16)$ **72.** $5 \times 6 \times (-1) \times (-12)$ **73.** $(-1) \times (-8) \times 3 \times 5$

74. $9 \times (-10) \times 4 \times (-25)$ **75.** $13 \times 3 \times (-1) \times 4$ **76.** $10 \times (-4) \times 2 \times 5$

77. $(-5)^2 \times (-2)^3 \times 3 \times (-1)$ **78.** $(-1)^3 \times (-3)^2 \times 2^3 \times (-5) \times (-10)$

Evaluate the following.

79. $-18 \div 3$ **80.** $-18 \div (-3)$ **81.** $-4 \div (-16)$ **82.** $45 \div (-9)$

83. $56 \div (-7)$ **84.** $625 \div (-5)$ **85.** $(-75) \div (-25)$ **86.** $(-100) \div (-4)$

87. $36 \div (-12)$ **88.** $90 \div (-18)$ **89.** $7 \div (-49)$ **90.** $-77 \div (11)$

91. $64 \div (-16)$ **92.** $45 \div (-3) \div (-5)$ **93.** $(-72) \div (-9) \div 2$ **94.** $(-108) \div 2 \div (-6)$

95. $140 \div (-7) \div 4$ **96.** $(-264) \div 11 \div 8$ **97.** $(-390) \div (-13) \div (-5)$

Evaluate the following.

98. $[(-3) + (-4)] \div 7$ **99.** $(-56) \div [7 + (-14)]$ **100.** $(-9) \times (-4) \div (-12)$

101. $[2 \times (-3) + (-12)] \div (-9)$ **102.** $[23 - (-5)] \div (-7)$ **103.** $26 \div [(-9) + (-4)]$

104. $\dfrac{(-2) \times (-5) + (-20)}{(-10)}$ **105.** $\dfrac{(-123) \times [19 + (-19)]}{38}$ **106.** $\dfrac{-18 + (-3)}{2 \times (-4) + (-3) \times (-5)}$

107. $\dfrac{15 \times (-4) - (-6) \times 5}{(-8) \times (-3) - (-1) \times (-9)}$ **108.** $(-10) \times (-6) \div [(-1) - (-6)] + (-10)$

109. $10\,000 \div [5 + (-25)]$ **110.** $144 \div (-6) \div 3 \times (-7) \times (-5)$

111. $[660 + (-264)] \div [(-264) \div (-6)]$ **112.** $[(-250) \times 4 + 280 \times (-6)] \div [-4 + (-6)]$

113. $129 \div (-3) \times [(-3) + (-2)] - (-25)$ **114.** $[(-282) \times (-5) - (-1\,236)] \div [5 - (-4)]$

115. $[(-4) \times (-5)^2 - (-3)^3 \times 2] \div (-23)$ **116.** $10 \times \{[(-20) \div (-2) + 10]^2 \div (-8) - (20 \div 2)^2 \div (-2)\} \times 100$

Simplify the following.

117. $\dfrac{1}{4} - \dfrac{3}{4}$ **118.** $-\dfrac{11}{20} + \dfrac{7}{20}$ **119.** $-\dfrac{13}{15} - \left(-\dfrac{3}{15}\right)$

120. $-\dfrac{15}{49} + \left(-\dfrac{6}{49}\right)$ **121.** $\dfrac{2}{15} - \dfrac{4}{15} - \dfrac{7}{15}$ **122.** $-\dfrac{9}{22} + \dfrac{5}{22} - \dfrac{7}{22}$

123. $-\dfrac{11}{35} + \left(-\dfrac{13}{35}\right) - \left(-\dfrac{19}{35}\right)$ **124.** $-\dfrac{9}{56} - \dfrac{11}{56} - \left(-\dfrac{13}{56}\right)$ **125.** $-4\dfrac{27}{28} + \left(-1\dfrac{3}{28}\right) - \left(-6\dfrac{9}{28}\right)$

126. $8\dfrac{5}{18} + \left(-4\dfrac{7}{18}\right) - 2\dfrac{11}{18} - \left(-\dfrac{13}{18}\right)$

Evaluate the following, expressing each answer in the simplest form.

127. $-2\dfrac{1}{3} - \left(-1\dfrac{1}{2}\right)$ **128.** $\dfrac{2}{5} - \left(-\dfrac{1}{6}\right)$ **129.** $-\left(-1\dfrac{1}{5}\right) + \left(-\dfrac{1}{3}\right)$

130. $2\dfrac{5}{9} - 3\dfrac{1}{4}$ **131.** $2\dfrac{1}{4} + \left(-1\dfrac{3}{5}\right)$ **132.** $-\left(-\dfrac{7}{8}\right) - 1\dfrac{3}{4}$

133. $9\dfrac{1}{4} + \left(-7\dfrac{3}{5}\right)$ **134.** $-4\dfrac{2}{9} - \left(-1\dfrac{1}{6}\right)$ **135.** $-2\dfrac{3}{4} + \left(-1\dfrac{1}{2}\right) - \left(-1\dfrac{2}{3}\right)$

136. $-6\dfrac{4}{9} - 3\dfrac{3}{4} - 3\dfrac{5}{9}$ **137.** $-\left(-3\dfrac{4}{7}\right) + 1\dfrac{2}{5} - \left(-\dfrac{3}{7}\right)$ **138.** $\dfrac{2}{3} - \left(-3\dfrac{3}{20}\right) + \left(-\dfrac{2}{5}\right)$

139. $-3\dfrac{4}{5} - 1\dfrac{3}{10} - \left(-2\dfrac{3}{4}\right)$ **140.** $\left(-\dfrac{1}{2} + \dfrac{1}{3}\right) + \left[\dfrac{1}{4} + \left(-\dfrac{1}{3}\right)\right] + \left(-\dfrac{1}{20}\right)$

Evaluate the following. Express each answer in its lowest terms.

141. $5 \times \left(-2\frac{2}{5}\right)$

142. $(-16) \div \left(-\frac{4}{5}\right)$

143. $16\frac{3}{10} \times (-5)$

144. $\left(-\frac{7}{18}\right) \times \left(-\frac{9}{14}\right)$

145. $\left(-\frac{4}{9}\right) \times \left(\frac{3}{14}\right)$

146. $15\frac{1}{6} \div (-5)$

147. $\left(-\frac{5}{6}\right) \div \left(-\frac{3}{4}\right)$

148. $\left(-7\frac{1}{3}\right) \div 1\frac{5}{6}$

149. $\frac{9}{11} \div \left(-\frac{4}{5}\right)$

150. $(-4) \div \left(-\frac{1}{4}\right) \times (-4)$

151. $\left(-2\frac{2}{5}\right) \times \frac{5}{6} \div (-13)$

152. $1\frac{7}{15} \div \left(-17\frac{2}{7}\right) \times 3\frac{3}{14}$

153. $\left(-2\frac{5}{7}\right) \div \left[1\frac{1}{3} \times \left(-\frac{3}{4}\right)\right]$

154. $3\frac{3}{5} \times (-6) \div \left(-4\frac{4}{5}\right)$

Simplify the following.

155. $20 \times \left(\frac{3}{4} - \frac{4}{5}\right)$

156. $\left(\frac{7}{27} - \frac{5}{36}\right) \times (-9)$

157. $\left(\frac{1}{4} - \frac{3}{4}\right) \div \left(-\frac{1}{4}\right)$

158. $\left[\left(-9\frac{1}{4}\right) - \left(-7\frac{3}{5}\right)\right] \div 2\frac{3}{4}$

159. $\left(-\frac{3}{4}\right) \times 1\frac{1}{2} + \frac{3}{4} \times \left(-2\frac{1}{2}\right)$

160. $\frac{1}{4} + \left(-\frac{3}{4}\right) \times \left(-1\frac{1}{4}\right)$

161. $7\frac{3}{5} \times (-45) - 2\frac{3}{5} \div \left(-\frac{1}{45}\right)$

162. $5 \times \left(-\frac{5}{13}\right) \div \left(\frac{1}{3} - \frac{7}{12}\right) \times (-26)$

163. $\left(-12\frac{1}{2}\right) + 1\frac{2}{3} \div (-4) - \frac{5}{7} \times \left(-2\frac{4}{5}\right)$

164. $\left[\left(-4\frac{2}{9}\right) - \left(-1\frac{1}{6}\right)\right] \times \left(-\frac{9}{11}\right) - \left(4\frac{1}{3} + 2\frac{3}{4}\right) \div \left(-4\frac{1}{4}\right)$

165. $2\frac{1}{11} + \left(-1\frac{7}{15}\right) \div \left(-17\frac{2}{7}\right) \times \left(-3\frac{3}{14}\right) + \left(-\frac{21}{22}\right)$

166. $\left(-5\frac{17}{20}\right) \times \left(-1\frac{1}{3}\right) + 2\frac{1}{2} \div \left(-4\frac{1}{6}\right) - \left(-3\frac{1}{4}\right)$

Simplify the following.

167. $\dfrac{-2\frac{3}{5} + 1\frac{1}{2}}{\left(-3\frac{2}{3}\right)}$

168. $\dfrac{\left(-\frac{3}{5}\right) + \left(-\frac{1}{5}\right)}{-1 + \frac{1}{5}}$

169. $\dfrac{4\frac{1}{2} \times \left(-5\frac{2}{3}\right) - 6}{\left(-6\frac{3}{4}\right)}$

170. $\dfrac{-7 + 1\frac{3}{5}}{-2\frac{3}{5} + \frac{2}{5} \times \left(-\frac{1}{4}\right)}$

171. $\dfrac{\left[\frac{1}{5} - \left(-\frac{1}{4}\right)\right] + \left(-\frac{1}{20}\right)}{\left(-1\frac{2}{5}\right) \times \left(-1\frac{1}{4}\right)}$

172. $\dfrac{-4\frac{3}{8} \times \left(3 - 1\frac{2}{7}\right)}{\left(-2\frac{1}{2} - 4\right) \div \left(-1\frac{11}{15}\right)}$

173. $\dfrac{-\frac{1}{2} + \frac{1}{3} + \left(-\frac{1}{4}\right)}{-1 - 1\frac{1}{8} \div (-3)}$

174. $\dfrac{-1 - \frac{1}{5}}{-1 - \dfrac{1}{-1 - \frac{2}{3}}}$

175. $\dfrac{-6}{-4 + \dfrac{1}{-\frac{1}{2} - (-3)}}$

176. $\dfrac{1 + \dfrac{1}{-1 - \frac{1}{2}}}{-1 + \dfrac{1}{\frac{1}{3} - 1}}$

Evaluate the following exactly.

177. $2{\cdot}45 - (-0{\cdot}312)$

178. $2{\cdot}35 \div (-4)$

179. $(-1{\cdot}25) \times (-8)$

180. $(-2{\cdot}002) \div 9{\cdot}1$

181. $16{\cdot}4 - (-3{\cdot}7) + (-2{\cdot}55)$

182. $(-1{\cdot}5)^2 - 2 \times (-0{\cdot}2)^3$

183. $-0{\cdot}65 + (-2{\cdot}1) \times (9{\cdot}6 - 10{\cdot}2)$

184. $30 \times (-0{\cdot}4) \times (-2{\cdot}5)$

185. $6{\cdot}304 \div (-1{\cdot}97) + (-19{\cdot}7) \times (-1{\cdot}8)$

186. $(-37{\cdot}6) \times (-3{\cdot}1) - 4(2{\cdot}55 - 3{\cdot}7)$

Use a calculator to evaluate the following. Give your answers correct to 3 decimal places.

187. $\left(0{\cdot}465\,8 - 3\frac{2}{15}\right) \times \left(-1\frac{11}{13}\right)$

188. $\sqrt{246} \times (-0{\cdot}555) \div (-1{\cdot}238\,9)$

189. $\left(-11\frac{6}{17}\right) \div \left(5{\cdot}96 - 9{\cdot}368 \times 2\frac{98}{99}\right)$

190. $[-4{\cdot}749 - 6{\cdot}558 \times (-2{\cdot}094)^3] \div \sqrt[3]{-1{\cdot}999}$

191. $\pi \times (4{\cdot}119)^2 \div (2{\cdot}008) + \left(31{\cdot}709 - \dfrac{\pi \times (8{\cdot}143)^2}{7{\cdot}985}\right)$

192. $-\sqrt{37{\cdot}089} \times \sqrt[3]{-65{\cdot}678} - \pi \times [(-3{\cdot}917) \div (-2{\cdot}007)]^2$

193. $\left[\left(2{\cdot}75 - 13\frac{2}{9}\right) \div \left(-11\frac{5}{7}\right) - \left(-12\frac{3}{5}\right)\right] \times \left(-\frac{55}{97}\right)$

194. $\left\{\left(\frac{1}{3}\right)^2 - \sqrt[3]{\frac{8}{33}} \times \left[-\sqrt{\frac{5}{6}} - (-0{\cdot}375)^3\right]\right\} \times [-\pi \div (-6{\cdot}5)]$

195. $\dfrac{(-49)^3 \div [-17 - (\sqrt{4 \times 5} - 10{\cdot}99^2)] + \sqrt[3]{4 \times 7}}{-\pi + \left(\sqrt[3]{(-2\frac{1}{2}) \times \frac{5}{7}}\right)}$

196. $\dfrac{\sqrt[3]{1\frac{1}{3}} - \left(\frac{2}{3} + (0{\cdot}75)^2\right) \div \left(\sqrt{0{\cdot}8} + \left(\frac{3}{7}\right)^3\right) \div 1\frac{33}{86} + (-2{\cdot}5)}{\left[1\frac{1}{6} - (-0{\cdot}375) + (-0{\cdot}75)\right] \div \pi - \left[-0{\cdot}35 - \left(-\frac{1}{3}\right)\right] \div 0{\cdot}1}$

222. 37·129 **223.** 0·9
224. 0·002 9 **225.** 14·9
226. 723·58 **227.** 0·311
228. 88·50 **229.** 9·188
230. (i) 32·968 8 (ii) 32·97
231. 0·007
232. (i) 0·056 088 (ii) 0·056 1
233. (i) 9·625 (ii) 9·6
234. 57·425 **235.** 24·187
236. 0·051 **237.** 45·991
238. 0·746 **239.** 359·185
240. 42·641 **241.** 0·633
242. 0·023 **243.** 4·877
244. 20·142 **245.** 36·303
246. 96·822 **247.** 7·765
248. 0·256 **249.** 13
250. \$51·52 **251.** \$17.44
252. 23

253. (a) $4\frac{7}{10}$ (b) 4·700 0

254. (a) $5\frac{41}{110}$ (b) 5·372 7

255. (a) $3\frac{1}{828}$ (b) 3·001 2

256. (a) $40\frac{5}{6}$ (b) 40·833 3

257. (a) $81\frac{6}{7}$ (b) 81·857 1

258. (a) $154\frac{7}{16}$ (b) 154·437 5

259. (a) $1\frac{39}{800}$ (b) 1·048 8

260. (a) $45\frac{15}{26}$ (b) 45·576 9

261. (a) $\frac{1}{6}$ (b) 0·166 7

262. (a) $15\frac{113}{120}$ (b) 15·941 7

263. (a) $\frac{7}{60}$ (b) 0·116 7

264. 396·37 **265.** 44·92 **266.** 1·68
267. 0·24 **268.** 29·96 **269.** 0·69
270. 0·22 **271.** 20·37 **272.** 8·95
273. 2·77 **274.** 1·24 **275.** 0·16
276. 0·56, 0·67 **277.** 1·6, 3·2

278. 2·0, 2·7 **279.** $\frac{1}{16}, \frac{1}{32}$

280. $\frac{5}{6}, \frac{6}{7}$ **281.** $\frac{9}{11}, \frac{11}{13}$

282. 1·3, 2·1 **283.** $\frac{4}{16}, \frac{12}{20}$

284. $\frac{1}{25}, \frac{1}{49}$ **285.** $\frac{25}{216}, \frac{36}{343}$

286. (i) $\frac{1}{7\times 8} = \frac{1}{7} - \frac{1}{8}$

(ii) $\frac{1}{10\,100}$

(iii) $m = 16, n = 17$

287. (i) $\frac{1}{1\times 2} + \frac{1}{2\times 3} + \frac{1}{3\times 4} + \frac{1}{4\times 5} + \frac{1}{5\times 6} + \frac{1}{6\times 7} = \frac{6}{7}$

(ii) $\frac{50}{51}$ (iii) 40 200

288. (i) $\frac{2}{8\times 9\times 10} = \frac{1}{8} - \frac{2}{9} + \frac{1}{10}$

(ii) $\frac{2}{40\times 41\times 42} = \frac{1}{34\,440}$

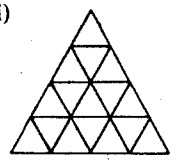
(iii) $p = 19, q = 20, r = 21$

Test 1A

1. (i) 180 (ii) 9 500
2. (a) (i) 2×7^2 (ii) $2^3\times 7$
(b) 14, 392 or $2^3\times 7^2$
3. (a) 1 024 (b) 27
4. (a) (i) 8 432 700 (ii) 8 432 700
(iii) 8 433 000
(b) (i) 80 (ii) 10 000
5. (i) 29, 23, 17 (ii) 570

Test 1B

1. (i) 8, 1, 6 (ii) 5, 6, 3
2. (i) 729 (ii) 1 024
3. (i) 105 (ii) 35; 35, 105
4. (i) 31, (ii) 2
5. (i) (ii) 9, 16, 25



(iii) (a) 36 (b) 100

Test 1C

1. (i) 579 (ii) 130 086
2. (a) 4 (b) 105 (c) 14
3. (a) 5 200 (b) 72 (c) 72
4. (i) 2 116 (ii) 1 444
5. (i) 187 (ii) 27 (iii) 31, 43

Chapter 5

1. +10 **2.** −91
3. −60 **4.** +14
5. (i) −1 (ii) 6 (iii) 3
(iv) 0 (v) 1
6. (i) −30 (ii) $-\frac{12}{2}$ (iii) $-\frac{4}{5}$
(iv) −1 (v) −13

7. −4 **8.** −14 **9.** −23
10. 0 **11.** −4 **12.** 5
13. −14 **14.** −44 **15.** 0
16. 6 **17.** −56 **18.** −56
19. 1 330 m **20.** 20°C
21. 7 **22.** 28 **23.** 10
24. 20 **25.** −100 **26.** −100
27. −200 **28.** −20 **29.** −100
30. −65 **31.** −10 **32.** −65
33. −50 **34.** 0 **35.** −1
36. 1 **37.** 5 **38.** −20
39. 20 **40.** −10 **41.** 20
42. 80 **43.** 10 **44.** −5
45. −20 **46.** −20 **47.** 40
48. −60 **49.** 100 **50.** 19
51. 0 **52.** 2 **53.** −40
54. −45 **55.** −72 **56.** −99
57. 64 **58.** 98 **59.** −1
60. −114 **61.** 800 **62.** 900
63. 180 **64.** −420 **65.** −280
66. −320 **67.** 120 **68.** −1 200
69. −720 **70.** −630 **71.** −1 280
72. 360 **73.** 120 **74.** 9 000
75. −156 **76.** −400 **77.** 600
78. −3 600 **79.** −6 **80.** 6

81. $\frac{1}{4}$ **82.** −5 **83.** −8

84. −125 **85.** 3 **86.** 25

87. −3 **88.** −5 **89.** $-\frac{1}{7}$

90. −7 **91.** −4 **92.** 3
93. 4 **94.** 9 **95.** −5
96. −3 **97.** −6 **98.** −1
99. 8 **100.** −3 **101.** 2
102. −4 **103.** −2 **104.** 1
105. 0 **106.** −3 **107.** −2
108. 2 **109.** −500 **110.** −280
111. 9 **112.** 268 **113.** 240
114. 294 **115.** 2 **116.** 0

117. $-\frac{1}{2}$ **118.** $-\frac{1}{5}$ **119.** $-\frac{2}{3}$

120. $-\frac{3}{7}$ **121.** $-\frac{3}{5}$ **122.** $-\frac{1}{2}$

123. $-\frac{1}{7}$ **124.** $-\frac{1}{8}$ **125.** $\frac{1}{4}$

126. 2 **127.** $-\frac{5}{6}$ **128.** $\frac{17}{30}$

129. $\frac{13}{15}$ **130.** $-\frac{25}{36}$ **131.** $\frac{13}{20}$

132. $-\frac{7}{8}$ **133.** $1\frac{13}{20}$ **134.** $-3\frac{1}{18}$

135. $-2\frac{7}{12}$ **136.** $-13\frac{3}{4}$ **137.** $5\frac{2}{5}$

138. $3\frac{5}{12}$ **139.** $-2\frac{7}{20}$ **140.** $-\frac{3}{10}$

141. −12 **142.** 20 **143.** $-81\frac{1}{2}$

144. $\frac{1}{4}$ **145.** $-\frac{2}{21}$ **146.** $-3\frac{1}{30}$

147. $1\frac{1}{9}$ **148.** -4 **149.** $-1\frac{1}{44}$

150. -64 **151.** $\frac{2}{13}$ **152.** $-\frac{3}{11}$

153. $2\frac{5}{7}$ **154.** $4\frac{1}{2}$ **155.** -1

156. $-1\frac{1}{12}$ **157.** 2 **158.** $-\frac{3}{5}$

159. -3 **160.** $1\frac{3}{16}$ **161.** -225

162. -200 **163.** $-10\frac{11}{12}$ **164.** $4\frac{1}{6}$

165. $\frac{19}{22}$ **166.** $10\frac{9}{20}$ **167.** $\frac{3}{10}$

168. 1 **169.** $4\frac{2}{3}$ **170.** 2

171. $-5\frac{1}{7}$ **172.** -2 **173.** $\frac{2}{3}$

174. 3 **175.** $1\frac{2}{3}$ **176.** $-\frac{2}{15}$

177. 2·762 **178.** −0·587 5
179. 10 **180.** −0·22
181. 17·55 **182.** 2·266
183. 0·61 **184.** 30
185. 32·26 **186.** 121·16
187. 4·925 **188.** 7·026
189. 0·515 **190.** −44·030
191. 32·165 **192.** 12·605
193. −7·651 **194.** 0·313
195. 271·344 **196.** −5·523

Chapter 6

1. C **2.** A **3.** D **4.** C
5. D **6.** D **7.** E **8.** B
9. C **10.** B **11.** C **12.** B
13. D **14.** B **15.** D **16.** A
17. D **18.** C **19.** A **20.** B
21. C **22.** D **23.** B **24.** D
25. C **26.** C
27. (i) 5·620 km (ii) 900 cm
(iii) 32 000 g (iv) 50 kg
28. (i) 4 cm (ii) 24 cm
(iii) 107 cm (iv) 655 cm
29. (i) 14·0 kg (ii) 57·5 kg
(iii) 108·4 kg (iv) 763·2 kg
30. (i) 7·0 cm^2 (ii) 40·1 cm^2
(iii) 148·3 cm^2 (iv) 168·4 cm^2
31. 3 **32.** 4 **33.** 2 **34.** 4
35. 1 **36.** 5 **37.** 2 **38.** 2
39. 5 **40.** 1, 2, 3, 4, 5 or 6
41. (i) 4·04 (ii) 2·56 (iii) 6 100
(iv) 0 700 (v) 0·005 00
42. (i) 140·1 (ii) 27·80
(iii) 0·080 40 (iv) 6 010
(v) 9·835
43. 4·1 **44.** 0·077 0 **45.** 5 004
46. 20 **47.** 18·1 **48.** 3·91
49. 38 **50.** 18·14 **51.** 0·008 17
52. 240·0 **53.** 0·054 **54.** 0·032 6
55. (i) 14 830 (ii) 14 831·2
(iii) 14 800 (iv) 14 831·15
(v) 15 000
56. (i) 0·04 (ii) 0·042 537 8
(iii) 0·042 5 (iv) 0·042 538
(v) 0·042 54
57. (i) 30 (ii) 40 (iii) 20
(iv) 80
58. (i) 500 000 (ii) 0·2 (iii) 3
(iv) 2 000 (v) 10 000
59. 80 **60.** 200 **61.** 6
62. 0·002 **63.** 7 **64.** 2 000
65. 20 **66.** 20 **67.** 20
68. 550 km
69. 12
70. \$75
71. \$100
72. 15 km/litre
73. 12 m^2
74. (a) \$4 000 (b) \$47 900
75. 1 200
76. 9
77. 20 mintues
78. (a) 30 m (b) 50 m^2
79. (a) (i) 3 000 mm (ii) 30 m
(b) (i) 300 m^2
(ii) 30 000 mm^2
80. 10 cm

Test 2A

1. (i) 15·33 (ii) 1·26 (iii) −26
2. (i) $3\frac{7}{9}$ (ii) $1\frac{7}{10}$
3. (a) 6·70 (b) 0·009 802
(c) 0·42 (d) $\frac{9}{20}$
4. (a) 2 000
(b) (i) 7 000 (ii) 100
5. (a) (i) $0\cdot2\dot{2}\dot{7}$ (ii) 0·23
(b) $3.1\dot{4}, \frac{22}{7}, 3.\dot{1}\dot{4}, 3.14$

Test 2B

1. (a) (i) 0·135 (ii) 0·000 144
(iii) 26
(b) (i) \$1·15 (ii) \$26·28
2. (a) 39 (b) (i) $1\frac{1}{5}$ (ii) $\frac{1}{14}$
3. (a) 0·455 (b) $2\frac{5}{8}$
(c) (i) 7 005 (ii) 7 004·58
4. (a) B (b) C (c) 100
5. (a) 0.033 186 (b) 0.000 036
(c) 0.000 008

Test 2C

1. (a) 6·34 (b) 6·00 (c) $\frac{5}{16}$
(d) $0\cdot5\dot{3}$
2. (a) $1\frac{1}{3}$ (b) (i) 60 (ii) 20
3. (a) $\frac{3}{17} < \frac{1}{5} < 0\cdot22 < \frac{2}{9}$
(b) (i) 8 (ii) 10
4. (a) B (b) C (c) 400
5. (a) (i) 880 (ii) 140
(b) (i) 196 875 (ii) 1·4

Term I Test A

1. (i) 276 (ii) 966
2. (i) 907 (ii) 47·52 (iii) 500
3. (a) (i) 0·325 (ii) 5·28
(iii) 0·537 5 (iv) 1·562 5
(b) (i) $\frac{49}{500}$ (ii) $\frac{17}{40}$
(iii) $\frac{23}{80}$ (iv) $1\frac{1}{16}$
4. (i) $3\frac{1}{10}$ (ii) 2 (iii) 2 (iv) $1\frac{2}{3}$
5. (a) 8·45 (b) 0·070
(c) 26 000 (d) 16 000
6. (i) 20 000 000 (ii) 20
(iii) 10 (iv) 20
7. (a) (i) $2^6 \times 3^2$
(ii) $2^3 \times 3^6$; 24, 18
(b) (i) 28 (ii) 9
(c) (i) 240 (ii) 1 260
8. (i) 9 (ii) −109
(iii) $-5\frac{1}{7}$ (iv) −134
9. (i) 1 667·45 (ii) 0·76
(iii) 0·03 (iv) 29·78
10. (i) (a) 32, 64
(b) 2 208, 4 416;
$32 \times 69 = 2\,208$,
$64 \times 69 = 4\,416$
(ii) (a) $13 \times 69 = 69 + 276 + 552$
$= 897$ $(13 = 1 + 4 + 8)$
(b) $29 \times 69 = 69 + 276 + 552$
$+ 1\,104 = 2\,001$
$(29 = 1 + 4 + 8 + 16)$
(c) 76×69
$= 276 + 552 + 4\,416$
$= 5\,244$ $(76 = 4 + 8 + 64)$

Chapter 7 BASIC ALGEBRA

Write an algebraic expression for each of the following.

1. Seven times x plus 3 times y.
2. Four times the square of h minus twice the cube of k.
3. Three x cubed plus two y squared.
4. Five times a plus b multiplied by the square root of c.
5. Twice x^2 minus 4 times the cube root of y.
6. The cost of x articles at two dollars each.
7. The cost of y apples which are sold at 3 for a dollar.
8. The total distance moved by a body in x hours at a speed of k km per hour.
9. Nine times the product of x and $3h$ minus the quotient when k is divided by $2y$.
10. The cube of the sum of x and y minus the square root of the sum of $5x$ and $3y$.

If $a = 3$, $b = 2$ and $c = -1$, find the value of each of the following.

11. $a^3 + b^3 + c^3 - 2abc$
12. $(2a + b - c)(4b - 3c)$
13. $(a - b)^2 - (b - c)^2$
14. $\frac{a}{b} + \frac{b}{c} - \frac{c}{a}$
15. $\frac{a+1}{2} - \frac{b+c}{4} + \frac{c-a}{3}$
16. $a^b - c^a + b^a$
17. $2a - 3b^2 + 3abc^2$
18. $a^2 + 3b^3 - 4c^5$
19. $\frac{a+b}{c} - \frac{ab-c}{b}$
20. $\frac{3a-b}{b-c} + \frac{a+c}{b-a}$
21. $\frac{2c^2 - 3a}{bc - a} - \frac{4b}{3a}$
22. $\frac{a^2 - b^2}{c^2} - \frac{a^3 - c}{(c - 3b)}$

23. Find the value of $x^3 + 2xy^2 + y^3$ when $x = 2$ and $y = -1$.

24. Find the value of $\frac{x+1}{x-1} + \frac{2x-1}{2x+1}$ when $x = -2$.

25. Find the value of $2ab + 3bc^2$ when $a = 0$, $b = 5$ and $c = -2$.

26. If $x = 2$ and $y = -3$, evaluate each of the following.
    (i) $x^2 + 3xy - y^2$ (ii) $x^3 - y^3$ (iii) $\frac{x}{y} - \frac{y}{x}$ (iv) y^x

27. Find the value of $x^3 + 2x^2 - 3(x + 2)$ when $x = -2$.

28. Find the value of $(2x - 1)(2x + 1)(2x + 3)$ when $x = -3$.

Simplify the following expressions.

29. $5a + 3a - 6a$
30. $7a - 5a + a$
31. $3a - (5a - 4a)$
32. $3a + 4b - a - b$
33. $2x - 3y + 7x - 4y - x$
34. $12a + 5b - 7a - 14b - 9a$
35. $5x + 7y + 3z - 2x - 4y + z$
36. $3a - 2b + 6c - 5a - 7b - c$
37. $2p - 5q + 7r - 4p + 2q - 3r$
38. $12xy - 13xz + 5yz - 4xz$
39. $7abc - 4bca + 6cba - cba$
40. $3a^2 - 4a + 5a^2 - 7a + 4$
41. $2x^3 - 5x^2 + 7x^3 - 4x^2 + 5x$
42. $3x^2 - 7x + 4x^3 - 5x + 6x^2$
43. $5ab - 1\frac{1}{2}ab + \frac{3}{4}bc + \frac{1}{4}cb$
44. $\frac{1}{2}x + \frac{1}{3}y - \frac{1}{4}x + \frac{2}{3}z + y$

Simplify each of the following.

45. $3(x - 2y) - 2(3x - y) + 6(x - y)$
46. $(x + y) - 2(5x - y) - 4(3x - 2y)$
47. $2(3x + y) - 5[3(x - 3y) - 4(2x - y)]$
48. $7[(x - y) - 2(x + 3y)] - 4(x - 13y)$
49. $2x - 3[2(5x - y) - 4[x - (7x - y)]]$
50. $[2(x + 5y) - 3(x - y)] - 7[3x - (x + 6y)]$

51. $3px + qy - rz - (px - qy + rz)$

52. $5p + 3q - 4r - (6q - 3p + r)$

53. $5a + 4b - 3c + \left(3\frac{1}{2}a + 2\frac{1}{2}b - 3\frac{1}{2}c\right) - \left(2a - 1\frac{1}{2}b + 1\frac{1}{2}c\right)$

54. $a(5a^2 - 4a - 3) - a^2(4a - 1) + a(1 - 2a^2)$

Simplify each of the following.

55. $\dfrac{4}{3a^2b} \div \dfrac{2}{9ab^2}$

56. $2t \times 6t^2$

57. $\dfrac{5}{6}x^2 \div \dfrac{3}{4}x$

58. $14x^6 \div 2x^3$

59. $\dfrac{10x - y}{2z} - \dfrac{x + y}{4z}$

60. $\dfrac{2xy}{3z} \times \dfrac{5xz}{4y} \div \dfrac{15x^2y}{8yz}$

61. $\sqrt{\dfrac{9x^2}{36y^4}} \div \dfrac{2y}{9x^2}$

62. $\dfrac{\sqrt{9x^2y^4}}{2} \div \dfrac{4x}{7y}$

63. $\left(\dfrac{3xy}{z}\right)^2 \div \dfrac{2x^3y}{5z} \times \left(\dfrac{4x}{15y}\right)^2$

64. $\sqrt{\dfrac{121x^4}{49y^6}} \times \dfrac{3xy^2}{4z} \div \left(\dfrac{x}{y}\right)^2$

Simplify the following algebraic fractions.

65. $\dfrac{x}{2} + \dfrac{x-3}{3} - \dfrac{x-4}{4}$

66. $\dfrac{2x - y}{2} + \dfrac{x - y}{3}$

67. $\dfrac{4x - y}{2} + \dfrac{x - y}{4} - \dfrac{2x + 3y}{3}$

68. $\dfrac{x + y}{2} - \dfrac{x + 5y}{4} + \dfrac{5x - 4y}{8}$

69. $\dfrac{2x - 3y}{5} - \dfrac{x - 6y}{10} + \dfrac{5x + 6y}{15}$

70. $\dfrac{5x - y}{4} - \dfrac{x - y}{6} + \dfrac{3x + 5y}{8}$

71. $\dfrac{5x - 6y}{7} + \dfrac{3x - 4y}{14} - \dfrac{7x + 9y}{21}$

72. $\dfrac{5x + 7y}{6} - \dfrac{x - y}{9} - \dfrac{2x - 3y}{12}$

73. $\dfrac{2x + 3y}{a} + \dfrac{5x + 2y}{2a}$

74. $\dfrac{5x - 9y}{2a} - \dfrac{4x - 7y}{4a} + \dfrac{6x - 5y}{6a}$

Find the sum of the following expressions.

75. $a + b + c,\ 2b - c,\ 3c + a$

76. $x + y,\ y - z,\ z - x$

77. $a^2 + b^2 - c^2,\ 2c^2 - b^2 + a^2,\ 5a^2 + 7c^2$

78. $2h^2 + 4k^2,\ -5h^2 - 7k^2,\ h^2 - k^2$

79. $2ab + 3bc,\ 5ac - 5ba,\ 2cb + 5ab$

80. $2a^3 + 3b^2 - c,\ 5b^3 + 2a^2 + 5c,\ a^3 - b^2$

81. $5abc - 7cb + 4ac,\ 4cba - 4bc + 3ca$

82. $9ab^2 - 7ab,\ 6bc + 5a^2b - 2ab^2,\ 4ab$

83. $\frac{1}{2}xy,\ \frac{1}{3}xy^2 - \frac{1}{4}yx,\ \frac{1}{6}xy^2 + xy$

84. $\frac{3}{4}xyz - \frac{1}{2}xz,\ \frac{2}{3}yz - \frac{1}{4}xyz - xz$

85. $x^2yz + xy^2z - xyz^2,\ \frac{1}{2}x^2yz - xy^2z$

86. $8x^3 + 7x^2,\ 4x^2 + 3x - 1,\ 8x^2 + 9x^3 - 4$

Subtract

87. $2x^3 + 5x^2 - 4x + 3$ from $7x^2 + 5x^3 - 4x - 5$.

88. $5x^3 + 4x^2 - 3x - 2$ from $14 + 2x - 12x^2 + 7x^3$.

89. $4x^2 + 7x^3 - 5x$ from $3x(2x^3 - 2x^2 + 7)$.

90. $x^3 - 6x - 4$ from $5x^3 - 5x^2 + 14$.

91. $12x^3 + 5x - 9$ from $2x(3x^2 - 5)$.

92. $x[5x - 3(x - 1)]$ from $4x - 4[2(x - 3) - x(2x - 5)]$.

93. $2a(3a^2 - 5a) + 5$ from $6a(2 - 3a + 5a^2) - 4(a^2 + 5)$.

94. $5x(2x - 4y) - 3(x - 7y)$ from $7(3x^2 + y) - 4x(3y - 5x)$.

95. Subtract $2x^2 + 3x^3 - 5$ from the sum of $(2x^3 - 5x + 7)$ and $(2x - 5x^3 + 4)$.

96. Subtract the sum of $(5x^2 - 7x + 4)$ and $(2x - 5x^3 + 1)$ from $2x(3x^2 - 1 + 5x)$.

97. Subtract the sum of $(2x^2 - 7x + 4)$ and $(5x - 4x^3 + 7)$ from the sum of $(3x^2 - 8x + 9)$ and $(15 - 4x - 3x^3)$.

Term I Test B

1. (i) 130 (ii) 440 (iii) 19 100 (iv) 32·4 (v) 0·424 3

2. (i) $40\frac{5}{6}$ (ii) 1 (iii) 6 (iv) 4

3. (i) 2·412 (ii) 13·9 (iii) 1

4. (a) (i) 462 (ii) 117
(b) 3, 216

5. (i) 400 (ii) 80 (iii) 5

6. (i) $-\frac{1}{2}$ (ii) −1 (iii) 4 (iv) $\frac{57}{68}$

7. (i) 3 (ii) 3 (iii) $\frac{1}{40}$

8. (a) 3 000
(b) (i) 59·96 (ii) 30·231
(c) (i) $1\dot{9}\dot{0}$ (ii) 1·91
(d) $\frac{21}{40}$

9. (a) (i) 50 (ii) 100
(b) 1026

10. (i) (a) 11, 13 (b) 24, 28
(c) 84, 112 (d) 85, 113
(ii) $13^2 + 84^2 = 85^2$,
$15^2 + 112^2 = 113^2$

Term I Test C

1. (i) 77 (ii) −130 (iii) −15 (iv) −86 (v) 1

2. (i) 1·125 (ii) 3·972 5
(iii) 4 (iv) 3

3. (i) $5\frac{1}{2}$ (ii) $\frac{1}{2}$
(iii) $1\frac{1}{22}$ (iv) $\frac{2}{15}$

4. (a) 0·687 5 (b) $1\frac{19}{40}$
(c) (i) 40·061 (ii) 40·06

5. (a) (i) 315 (ii) 1 080
(iii) 1 320
(b) (i) 42 (ii) 126

6. (a) (i) $\frac{33}{100}, 0{\cdot}333, 0{\cdot}\dot{3}, 1{\cdot}73, 1\frac{3}{4}$
(ii) $\frac{83}{220}, \frac{17}{44}, \frac{64}{165}, \frac{103}{264}$
(b) \$7 752

7. (i) 300 (ii) 20 (iii) 90

8. \$2 000

9. (i) 593·29 (ii) 7·08
(iii) 684·83

10. (a) $32 \times 57 = 1\,824$,
$64 \times 57 = 3\,648$
(b) (i) 1 197 (ii) 1 539
(iii) 2 223

Chapter 7

1. $7x + 3y$ **2.** $4h^2 - 2k^3$
3. $3x^3 + 2y^2$ **4.** $5a + b\sqrt{c}$
5. $2x^2 - 4\sqrt[3]{y}$ **6.** \$2x
7. $\$\frac{1}{3}y$ or $\$\frac{y}{3}$ **8.** xk km
9. $27xh - \frac{k}{2y}$ **10.** $(x+y)^3 - \sqrt{15xy}$
11. 46 **12.** 99 **13.** −8
14. $-\frac{1}{6}$ **15.** $\frac{5}{12}$ **16.** 18
17. 12 **18.** 37 **19.** $-8\frac{1}{2}$
20. $\frac{1}{3}$ **21.** $\frac{23}{45}$ **22.** 9
23. 11 **24.** 2 **25.** 60
26. (i) −23 (ii) 35 (iii) $\frac{5}{6}$ (iv) 9
27. 0 **28.** −105 **29.** $2a$
30. $3a$ **31.** $2a$ **32.** $2a + 3b$
33. $8x - 7y$ **34.** $-4a - 9b$
35. $3x + 3y + 4z$ **36.** $-2a - 9b + 5c$
37. $-2p - 3q + 4r$
38. $12xy - 17xz + 5yz$
39. $8abc$
40. $8a^2 - 11a + 4$
41. $9x^3 - 9x^2 + 5x$
42. $4x^3 + 9x^2 - 12x$
43. $3\frac{1}{2}ab + bc$
44. $\frac{1}{4}x + 1\frac{1}{3}y + \frac{2}{3}z$
45. $3x - 10y$ **46.** $11y - 21x$
47. $31x + 27y$ **48.** $3y - 11x$
49. $-100x + 18y$ **50.** $-15x + 55y$
51. $2px + 2qy - 2rz$
52. $8p - 3q - 5r$
53. $6\frac{1}{2}a + 8b - 8c$
54. $-a^3 - 3a^2 - 2a$
55. $\frac{6b}{a}$ **56.** $12t^3$
57. $\frac{10x}{9}$ **58.** $7x^3$
59. $\frac{19x - 3y}{4z}$ **60.** $\frac{4z}{9}$
61. $\frac{9x^3}{4y^3}$ **62.** $\frac{21y^3}{8}$
63. $\frac{8x}{5yz}$ **64.** $\frac{33xy}{28z}$
65. $\frac{7x}{12}$ **66.** $\frac{8x - 5y}{6}$
67. $\frac{19x - 21y}{12}$ **68.** $\frac{7x - 10y}{8}$
69. $\frac{19x + 12y}{30}$ **70.** $\frac{35x + 13y}{24}$
71. $\frac{25x - 66y}{42}$ **72.** $\frac{20x + 55y}{36}$
73. $\frac{9x + 8y}{2a}$ **74.** $\frac{30x - 43y}{12a}$
75. $2a + 3b + 3c$ **76.** $2y$
77. $7a^2 + 8c^2$ **78.** $-2h^2 - 4k^2$
79. $2ab + 5bc + 5ac$
80. $3a^3 + 5b^3 + 2a^2 + 2b^2 + 4c$
81. $9abc - 11bc + 7ac$
82. $7ab^2 + 5a^2b - 3ab + 6bc$
83. $\frac{1}{2}xy^2 + 1\frac{1}{4}xy$
84. $\frac{1}{2}xyz - 1\frac{1}{2}xz + \frac{2}{3}yz$
85. $1\frac{1}{2}x^2yz - xyz^2$
86. $17x^3 + 19x^2 + 3x - 5$
87. $3x^3 + 2x^2 - 8$
88. $2x^3 - 16x^2 + 5x + 16$
89. $6x^4 - 13x^3 - 4x^2 + 26x$
90. $4x^3 - 5x^2 + 6x + 18$
91. $-6x^3 - 15x + 9$
92. $6x^2 - 27x + 24$
93. $24a^3 - 12a^2 + 12a - 25$
94. $31x^2 + 8xy + 3x - 14y$
95. $-6x^3 - 2x^2 - 3x + 16$
96. $11x^3 + 5x^2 + 3x - 5$
97. $x^3 + x^2 - 10x + 13$

Chapter 8

1. 5 **2.** 4 **3.** 1 **4.** −3
5. 3 **6.** $-6\frac{2}{3}$ **7.** $-3\frac{3}{4}$
8. $-1\frac{1}{2}$ **9.** $1\frac{1}{2}$ **10.** $2\frac{10}{11}$
11. 3 **12.** $-2\frac{1}{6}$ **13.** 20
14. 12·5 **15.** 8 **16.** 30
17. 1·05 **18.** 8·5 **19.** 13
20. −8 **21.** 0·8 **22.** 13
23. $6\frac{1}{3}$ **24.** $4\frac{1}{3}$ **25.** 2
26. $-\frac{1}{2}$ **27.** $-7\frac{1}{5}$ **28.** −33
29. $-\frac{1}{4}$ **30.** 8 **31.** $-2\frac{2}{7}$
32. $3\frac{3}{4}$ **33.** 4 **34.** $-1\frac{1}{2}$
35. $1\frac{10}{11}$ **36.** $\frac{8}{17}$ **37.** $\frac{23}{212}$
38. 8 **39.** −2 **40.** −3
41. 5 **42.** −13 **43.** $4\frac{1}{2}$

Chapter 8 ALGEBRAIC EQUATIONS

Solve the following equations.

1. $2x - 7 = 3$ **2.** $3x - 4 = 8$ **3.** $5x + 2 = 7$ **4.** $3x + 9 = 0$

5. $15 - 2x = 9$ **6.** $17 + 3x = -3$ **7.** $5x = -15 + x$ **8.** $-2x - 7 = -4$

9. $5x - 4 = 3x - 1$ **10.** $7x - 14 = 18 - 4x$ **11.** $8x - 7 = 5 + 4x$ **12.** $9x + 4 = 3x - 9$

Solve the following equations.

13. $\frac{3}{4}x = 15$ **14.** $\frac{2}{5}x - 1 = 4$ **15.** $5 - \frac{x}{4} = 3$ **16.** $\frac{x}{3} + 5 = 15$ **17.** $2 + \frac{5}{7}x = 1\frac{1}{4}$

18. $\frac{2x+4}{7} = 3$ **19.** $\frac{3x-4}{5} - 7 = 0$ **20.** $\frac{3x+4}{2} = x - 2$ **21.** $\frac{2x-1}{3} = 1 - x$ **22.** $7 + \frac{x-1}{2} = x$

Solve the following equations.

23. $3(x - 4) = 7$ **24.** $9(x - 4) = 3$ **25.** $5(2x + 3) = 35$

26. $8(2 + 3x) = 4$ **27.** $7(x + 4) = 2(x - 4)$ **28.** $5(3x + 5) = 2(7x - 4)$

29. $2(5 - 2x) = 4(2 - 3x)$ **30.** $2(x + 1) = 3(x - 5) + 9$ **31.** $\frac{1}{4}(5x + 4) = \frac{1}{3}(2x - 1)$

32. $2[2(x - 4) + 3] = 5$ **33.** $2x - [3 + (x - 5)] = 6$ **34.** $17(x - 3) = 3(7x - 15)$

Solve the following equations.

35. $\frac{1}{3}(x - 3) - x + 5 = 3(x - 1)$ **36.** $\frac{2(x-1)}{3} + \frac{3x}{4} = 0$ **37.** $\frac{1}{5}(x + 6) - \frac{2}{3}(2 - 5x) = \frac{1}{4}$

38. $\frac{6x+1}{7} - \frac{2x-7}{3} = 4$ **39.** $4x + 1 - \frac{1}{2}(3x - 2) - \frac{1}{3}(4x - 1) = 0$

40. $\frac{2x}{9} - \frac{x-1}{6} = \frac{x+3}{12}$ **41.** $\frac{3x}{5} - \frac{x-2}{3} = 2$ **42.** $\frac{x-14}{3} - \frac{x-3}{4} = \frac{2x+1}{5}$

43. $\frac{3x-4}{6} - \frac{2x+3}{8} = \frac{2x-7}{24}$ **44.** $\frac{2}{3}x + 3 = 2\frac{1}{2}x + 5$ **45.** $\frac{1}{2}(2x - 1) - \frac{2}{9}(x - 2) = \frac{2x-3}{4}$

46. $\frac{1}{2}\left(2x - \frac{1}{2}\right) = \frac{1}{3}\left(3x - \frac{1}{4}\right) + \frac{1}{4}(4x - 3)$ **47.** $2\left(\frac{1}{5} - 3x\right) - \frac{1}{5}(x + 2) = \frac{1}{15}(3x + 4)$

Solve the following equations. Give your answers correct to 2 decimal places where necessary.

48. $0{\cdot}15x + 2{\cdot}35(x - 2) = 1{\cdot}3$ **49.** $\frac{x}{4} = \frac{x+12}{10} + 0{\cdot}6$

50. $\frac{5x+2}{7} = \frac{x-3}{5} + x + 1{\cdot}5$ **51.** $0{\cdot}5x + 2 = \frac{1}{4} + \frac{x-1}{3} + \frac{1}{4}x - \frac{1}{6}$

52. $0{\cdot}5x - 2{\cdot}25 = \frac{7x}{12} + 0{\cdot}5 + \frac{4x-3}{6}$ **53.** $(x + 0{\cdot}5) + \frac{1}{2}\left(3x - \frac{1}{3}\right) = \frac{1}{3}(x + 1)$

Solve the following equations.

54. $\frac{3}{x} + \frac{4}{x} = 5$ **55.** $\frac{5}{x} + \frac{2}{3x} = 1$ **56.** $\frac{2}{x} - \frac{3}{x} + 1 = 3$

57. $\frac{5}{1-x} + \frac{7}{2-2x} = 4$ **58.** $\frac{5}{x+2} - \frac{3}{2x+4} = 7$ **59.** $\frac{3}{x} + \frac{4}{x} - \frac{7}{2x} = 3$

Find the unknown value in each case.

60. If $xy - 3y^2 = 15$, find x when $y = 2$.

61. If $5pq + tq = 2p + 5$, find t when $p = 2$ and $q = 3$.

62. If $3u - 4uv = 5v^2$, find u when $v = 4$.

63. If $3x^2 + 5x^2y = 14$, find y when $x = -1$.

64. If $p - 5q = 4qr$, find p when $q = 4$ and $r = -1$.

65. If $x - 2y = z + 3$, find y when $x = 4$ and $z = 2$.

66. If $x - y = \dfrac{xy}{p - q}$, find x when $y = 2$, $p = 5$ and $q = 6$.

67. If $\dfrac{p - q}{x} = \dfrac{3x + q}{y}$, find y when $x = 5$, $p = 5$ and $q = 3$.

68. If $\dfrac{x - 1}{y + 3} - \dfrac{x}{y} = \dfrac{1}{z}$, find x when $y = 8$ and $z = 2$.

69. If $3x + 2y = \dfrac{6 + z}{z - 4}$, find z when $x = 5$ and $y = -4$.

70. If $\dfrac{2x + y - 3z}{y + 3z} = \dfrac{x}{2y}$, find x when $y = 4$ and $z = 1$.

71. If $A = P + \dfrac{PRT}{100}$,

(i) find A when $P = 5\,000$, $R = 5$ and $T = 3$,

(ii) find P when $A = 6\,500$, $R = 5$ and $T = 1\dfrac{2}{3}$.

72. If $\dfrac{3x - 5y}{7x - 4y} = \dfrac{3}{4}$, find the value of $\dfrac{x}{y}$.

73. If $\dfrac{5x + y}{3x - y} = \dfrac{2}{5}$, find the value of $\dfrac{2x}{y}$.

74. If $\dfrac{x - 4y}{5x + y} = \dfrac{3}{5}$, find the value of $\dfrac{x}{3y}$.

75. If $\dfrac{4x + 5y}{6x + y} = \dfrac{1}{4}$, find the value of $\dfrac{2x}{3y}$.

76. A number exceeds another by 4 and their sum is 32. Find the two numbers.

77. When a number is doubled and 5 is subtracted from the result, the answer is 37. What is the number?

78. The sum of two numbers is 120. If the larger number is four times the smaller number, what are the two numbers?

79. The sum of three consecutive numbers is 93. Find the smallest of these numbers.

80. The sum of three consecutive even numbers is 210. Find the largest of these numbers.

81. The sum of three consecutive odd numbers is 243. Find the three numbers.

82. The sum of four consecutive numbers is 210. Find the four numbers.

83. The sum of five consecutive even numbers is 220. Find the smallest of these numbers.

84. Find two consecutive odd numbers such that when the smaller number is subtracted from three times the bigger number, the result is 56.

85. When 42 is added to twice a number, the result is 346. Find the number.

86. When a number is divided by 4 and has 12 subtracted from it, the result is $\dfrac{1}{6}$ of the number. What is the number?

87. When a number x is multiplied by 5, it gives the same result as when 48 is added to twice the number. Find the number.

88. Ahmad is twice as old as Bobby. John is 7 years younger than Ahmad. If the sum of their ages is 38, how old are the three boys?

89. Janet is three times as old as her daughter, Mary. Five years ago, Janet was 4 times as old as Mary. How old is Janet now? How old will Mary be in 7 years' time?

90. A man was 26 years old when his son was born. Now, he is three times as old as his son. How old is the son now?

91. A father is four times as old as his son. The difference in their ages is 36. Find the sum of their ages in 5 years' time.

92. Ben is three times as old as Carl now. In two years' time, Ben will be twice as old as Carl. How old is Carl now?

93. Ali is 8 years older than Fatimah. Six years ago, Ali was 5 times as old as Fatimah. How old is Fatimah? How old will Ali be in 8 years' time?

94. Zhongmin is 50 years old. His son, Mingyong is 24 years old. How many years ago was Zhongmin three times as old as Mingyong?

95. The sum of the ages of two brothers is 24. In three years' time, the elder brother will be twice as old as the younger brother. How old are the brothers?

96. Adam is 5 times as old as Charles. In 8 years' time, the sum of their ages will be equal to twice Adam's present age. Find their present ages.

97. Tom is twice as old as Harry. In 9 years' time, their combined ages will be five times Harry's present age. How old is Tom now? How old will Harry be in 9 years' time?

98. A, B and C shared \$1 540. A received three times as much money as B and C's share is half that of A's. How much money did C receive?

99. Ahmad has \$12·50 and Muthu has \$46·70. If Ahmad saves 40 cents and Muthu spends 50 cents daily, after how many days will both of them have the same amount of money?

100. A librarian bought 50 books for a library. Each hard cover book is $1\frac{1}{2}$ times as expensive as each paperback which costs \$4 each. How many hard cover books did the librarian buy if he spent a total of \$256 on the books?

101. Divide \$240 among Aravin, Ben and Chandran such that Aravin will have twice as much money as Ben and Chandran will have one-quarter of what Aravin and Ben have altogether. How much money will Chandran receive?

102. P and Q have the same amount of money. If P gives Q \$24, then Q will have twice as much money as P. How much money does P have originally?

103. Mary has 54 coins which are either 20-cent coins or 50-cent coins. If the total amount is \$20·70, how many 20-cent coins does Mary have?

104. The length of a rectangle is 7 cm longer than its width. If the perimeter of the rectangle is 74 cm, find the length and the area of the rectangle.

105. Find four consecutive odd numbers such that three times the largest number added to twice the smallest number is 93.

106. Solve each of each the following equations:

(a) $x = \frac{x+8}{4}$ **(b)** $1 - \frac{2x}{5} = 4$

(c) $\frac{x}{3} - \frac{x}{5} = 4$ **(d)** $\frac{x}{2} = 3x - 5$

(e) $3x = \frac{9}{5}$ **(f)** $\frac{7}{2x} = \frac{5}{14}$

(g) $3x + 2 = x + 7$ **(h)** $x + 5 = 2 - 3(x - 4)$

(i) $5y + 4 = 2(5 - 2y)$ **(j)** $4(2k - 7) - 3(6 - 5k) = 1$

(k) $5x - 7 = 17 - 3(2 - x)$ **(l)** $13 = 3x - 5(x - 1)$

107. A hawker bought x kg of beef at \$8.50 per kg and $(2x + 5)$kg of chicken at \$3.60 per kg. If the total cost was \$206.40, find the value of x.

108. The school librarian bought 84 books, some at \$8.40 each and the rest at \$5.50 each. If the total bill for the 84 books was \$607, how many books costing \$5.50 each did he buy?

109. Peter and Jane together have \$90. If Peter gave Jane \$16, he would then have \$14 less than Jane. How much does Peter originally have?

110. The sum of three numbers is 92. The second number is three times the first and the third exceeds the second by 8. Find the three numbers.

111. On a journey of 375 km, a motorist travels part of the journey on an expressway at 95 km/h and the rest at 65 km/h. The total time he spends on the stretch of road at 65 km/h is twice the time he spends on the expressway. How long did he take for the whole journey?

Term I Test B

1. (i) 130 (ii) 440 (iii) 19 100 (iv) 32·4 (v) 0·424 3

2. (i) $40\frac{5}{6}$ (ii) 1 (iii) 6 (iv) 4

3. (i) 2·412 (ii) 13·9 (iii) 1

4. (a) (i) 462 (ii) 117 (b) 3, 216

5. (i) 400 (ii) 80 (iii) 5

6. (i) $-\frac{1}{2}$ (ii) −1 (iii) 4 (iv) $\frac{57}{68}$

7. (i) 3 (ii) 3 (iii) $\frac{1}{40}$

8. (a) 3 000
(b) (i) 59·96 (ii) 30·231
(c) (i) $1\cdot\dot{9}\dot{0}$ (ii) 1·91
(d) $\frac{21}{40}$

9. (a) (i) 50 (ii) 100
(b) 1026

10. (i) (a) 11, 13 (b) 24, 28
(c) 84, 112 (d) 85, 113
(ii) $13^2 + 84^2 = 85^2$,
$15^2 + 112^2 = 113^2$

Term I Test C

1. (i) 77 (ii) −130 (iii) −15 (iv) −86 (v) 1

2. (i) 1·125 (ii) 3·972 5
(iii) 4 (iv) 3

3. (i) $5\frac{1}{2}$ (ii) $\frac{1}{2}$
(iii) $1\frac{1}{22}$ (iv) $\frac{2}{15}$

4. (a) 0·687 5 (b) $1\frac{19}{40}$
(c) (i) 40·061 (ii) 40·06

5. (a) (i) 315 (ii) 1 080
(iii) 1 320
(b) (i) 42 (ii) 126

6. (a) (i) $\frac{33}{100}, 0\cdot333, 0\cdot\dot{3}, 1\cdot73, 1\frac{3}{4}$
(ii) $\frac{83}{220}, \frac{17}{44}, \frac{64}{165}, \frac{103}{264}$
(b) $7 752

7. (i) 300 (ii) 20 (iii) 90

8. $2 000

9. (i) 593·29 (ii) 7·08
(iii) 684·83

10. (a) $32 \times 57 = 1\,824$,
$64 \times 57 = 3\,648$
(b) (i) 1 197 (ii) 1 539
(iii) 2 223

Chapter 7

1. $7x + 3y$ **2.** $4h^2 - 2k^3$

3. $3x^3 + 2y^2$ **4.** $5a + b\sqrt{c}$

5. $2x^2 - 4\sqrt[3]{y}$ **6.** $2x

7. $\$\frac{1}{3}y$ or $\$\frac{y}{3}$ **8.** $xk km

9. $27xh - \frac{k}{2y}$ **10.** $(x+y)^3 - \sqrt{15xy}$

11. 46 **12.** 99 **13.** −8

14. $-\frac{1}{6}$ **15.** $\frac{5}{12}$ **16.** 18

17. 12 **18.** 37 **19.** $-8\frac{1}{2}$

20. $\frac{1}{3}$ **21.** $\frac{23}{45}$ **22.** 9

23. 11 **24.** 2 **25.** 60

26. (i) −23 (ii) 35 (iii) $\frac{5}{6}$ (iv) 9

27. 0 **28.** −105 **29.** $2a$

30. $3a$ **31.** $2a$ **32.** $2a + 3b$

33. $8x - 7y$ **34.** $-4a - 9b$

35. $3x + 3y + 4z$ **36.** $-2a - 9b + 5c$

37. $-2p - 3q + 4r$

38. $12xy - 17xz + 5yz$

39. $8abc$

40. $8a^2 - 11a + 4$

41. $9x^3 - 9x^2 + 5x$

42. $4x^3 + 9x^2 - 12x$

43. $3\frac{1}{2}ab + bc$

44. $\frac{1}{4}x + 1\frac{1}{3}y + \frac{2}{3}z$

45. $3x - 10y$ **46.** $11y - 21x$

47. $31x + 27y$ **48.** $3y - 11x$

49. $-100x + 18y$ **50.** $-15x + 55y$

51. $2px + 2qy - 2rz$

52. $8p - 3q - 5r$

53. $6\frac{1}{2}a + 8b - 8c$

54. $-a^3 - 3a^2 - 2a$

55. $\frac{6b}{a}$ **56.** $12t^3$

57. $\frac{10x}{9}$ **58.** $7x^3$

59. $\frac{19x - 3y}{4z}$ **60.** $\frac{4z}{9}$

61. $\frac{9x^3}{4y^3}$ **62.** $\frac{21y^3}{8}$

63. $\frac{8x}{5yz}$ **64.** $\frac{33xy}{28z}$

65. $\frac{7x}{12}$ **66.** $\frac{8x - 5y}{6}$

67. $\frac{19x - 21y}{12}$ **68.** $\frac{7x - 10y}{8}$

69. $\frac{19x + 12y}{30}$ **70.** $\frac{35x + 13y}{24}$

71. $\frac{25x - 66y}{42}$ **72.** $\frac{20x + 55y}{36}$

73. $\frac{9x + 8y}{2a}$ **74.** $\frac{30x - 43y}{12a}$

75. $2a + 3b + 3c$ **76.** $2y$

77. $7a^2 + 8c^2$ **78.** $-2h^2 - 4k^2$

79. $2ab + 5bc + 5ac$

80. $3a^3 + 5b^3 + 2a^2 + 2b^2 + 4c$

81. $9abc - 11bc + 7ac$

82. $7ab^2 + 5a^2b - 3ab + 6bc$

83. $\frac{1}{2}xy^2 + 1\frac{1}{4}xy$

84. $\frac{1}{2}xyz - 1\frac{1}{2}xz + \frac{2}{3}yz$

85. $1\frac{1}{2}x^2yz - xyz^2$

86. $17x^3 + 19x^2 + 3x - 5$

87. $3x^3 + 2x^2 - 8$

88. $2x^3 - 16x^2 + 5x + 16$

89. $6x^4 - 13x^3 - 4x^2 + 26x$

90. $4x^3 - 5x^2 + 6x + 18$

91. $-6x^3 - 15x + 9$

92. $6x^2 - 27x + 24$

93. $24a^3 - 12a^2 + 12a - 25$

94. $31x^2 + 8xy + 3x - 14y$

95. $-6x^3 - 2x^2 - 3x + 16$

96. $11x^3 + 5x^2 + 3x - 5$

97. $x^3 + x^2 - 10x + 13$

Chapter 8

1. 5 **2.** 4 **3.** 1 **4.** −3

5. 3 **6.** $-6\frac{2}{3}$ **7.** $-3\frac{3}{4}$

8. $-1\frac{1}{2}$ **9.** $1\frac{1}{2}$ **10.** $2\frac{10}{11}$

11. 3 **12.** $-2\frac{1}{6}$ **13.** 20

14. 12·5 **15.** 8 **16.** 30

17. 1·05 **18.** 8·5 **19.** 13

20. −8 **21.** 0·8 **22.** 13

23. $6\frac{1}{3}$ **24.** $4\frac{1}{3}$ **25.** 2

26. $-\frac{1}{2}$ **27.** $-7\frac{1}{5}$ **28.** −33

29. $-\frac{1}{4}$ **30.** 8 **31.** $-2\frac{2}{7}$

32. $3\frac{3}{4}$ **33.** 4 **34.** $-1\frac{1}{2}$

35. $1\frac{10}{11}$ **36.** $\frac{8}{17}$ **37.** $\frac{23}{212}$

38. 8 **39.** −2 **40.** −3

41. 5 **42.** −13 **43.** $4\frac{1}{2}$

$\frac{x+13y}{24}$

$\frac{x+55y}{36}$

$\frac{x-43y}{12a}$

h^2-4k^2

c

4. -3

$-3\frac{3}{4}$

$2\frac{10}{11}$

20

30

13

13

2

-33

$-2\frac{2}{7}$

$-1\frac{1}{2}$

$\frac{23}{212}$

-3

$4\frac{1}{2}$

44. $-1\frac{1}{11}$ **45.** $-2\frac{1}{2}$ **46.** $\frac{7}{12}$

47. $\frac{-1}{24}$ **48.** 2·4 **49.** 12

50. −1·26 **51.** 27 **52.** −3

53. 0 **54.** $1\frac{2}{5}$ **55.** $5\frac{2}{3}$

56. $-\frac{1}{2}$ **57.** $-1\frac{1}{8}$ **58.** $-1\frac{1}{2}$

59. $1\frac{1}{6}$ **60.** $13\frac{1}{2}$ **61.** −7

62. $-6\frac{2}{13}$ **63.** $2\frac{1}{5}$ **64.** 4

65. $-\frac{1}{2}$ **66.** $\frac{2}{3}$ **67.** 45

68. $-17\frac{1}{3}$ **69.** $5\frac{2}{3}$ **70.** $\frac{-8}{9}$

71. (i) 5 750 (ii) 6 000

72. $\frac{-8}{9}$ **73.** $-\frac{14}{19}$ **74.** $-\frac{23}{30}$

75. $-1\frac{4}{15}$ **76.** 14, 18 **77.** 21

78. 24, 96 **79.** 30 **80.** 72

81. 79, 81, 83 **82.** 51, 52, 53, 54

83. 40 **84.** 25, 27 **85.** 152

86. 144 **87.** 16

88. Ahmad — 18, Bobby — 9, John — 11

89. 45 yr, 22 yr **90.** 13 yr

91. 70 yr **92.** 2 yr

93. 8 yr, 24 yr **94.** 11 yr

95. 7 yr, 17 yr **96.** 20 yr, 4 yr

97. 18 yr, 18 yr **98.** $420

99. 38 **100.** 28

101. $48 **102.** $72

103. 21 **104.** 330 cm²

105. 15, 17, 19, 21

106. (a) $2\frac{2}{3}$ (b) $-7\frac{1}{2}$
(c) 30 (d) 2
(e) $\frac{3}{5}$ (f) $9\frac{4}{5}$
(g) $2\frac{1}{2}$ (h) $2\frac{1}{4}$
(i) $\frac{2}{3}$ (j) $2\frac{1}{23}$
(k) 2 (l) −4

107. $x = 12$

108. 34

109. $54

110. 12, 36, 44 **111.** 5 hours

Test 3A

1. (i) 9 (ii) 20 (iii) 35

2. (i) $7y-3x$ (ii) $\frac{y-x}{8}$ or $\frac{1}{8}(y-x)$

3. (i) −2 (ii) −4 **4.** 43 yr

5. $3x^4-2x^3+x^2-10x-6$

Test 3B

1. (i) 16 (ii) −11 (iii) 10

2. (i) 2 (ii) $\frac{7b}{3}$

3. $-4x^3-8x^2-3x-5$

4. (i) $\frac{a^3b^2}{8}$ (ii) $\frac{b}{2a}$

5. (i) 4 (ii) 4 (iii) $-1\frac{1}{3}$

Test 3C

1. $-\frac{2}{23}$

2. (i) $21-5x$ (ii) $\frac{10-x}{12}$

3. 39 yr, 13 yr

4. (i) $\$(x-5)$ (ii) $\$(x-7)$

(iii) $\$\left(x-\frac{1}{2}t\right)$

5. 9, 11

Term II Test A

1. (i) −3 (ii) 7 (iii) 2

2. (i) $8a-9$ (ii) $5x+3y$
(iii) −14

3. (i) $\frac{2}{3}$ (ii) 6 (iii) $2\frac{1}{2}$

4. (i) $2y-z$ (ii) $5t-u+3v$
(iii) px (iv) $2bm$ (v) $4pqy$

5. (a) 31 (b) 30 yr, 8 yr

6. (a) 40, 20 (b) 45 m

7. (a) 25 (b) $50l$ (c) 50

8. (a) 6 (b) −30 (c) $1\frac{1}{30}$

9. (a) $2\frac{1}{7}$ (b) $\frac{3}{4}$

10. $1\frac{7}{25}$

Term II Test B

1. (i) 0·312 9 (ii) 358·5
(iii) 10·27

2. (i) $4\frac{1}{3}$ (ii) $q-p-8r$

3. (i) 0·05, 0·006 (ii) 1, $\frac{1}{2}$
(iii) 26, 42 (iv) 50, 65

4. (i) 5 (ii) 27
(iii) 13 (iv) $-12\frac{1}{2}$

5. (i) $x^2+33xy-3xz$
(ii) $17x-y^2$
(iii) $5p^2-pq-5q^2$

6. $1\frac{3}{5}$

7. (a) 74 152 (b) 560

8. $-20x^3+6x^2+2x+5$

9. 50

10. (a) $5a+4b-2c$
(b) 34

Term II Test C

1. 300 **2.** 1 440, 12

3. (i) $7-6x$ (ii) $\frac{25(x-y)}{12}$

4. (i) −17 (ii) $\frac{12}{13}$
(iii) 15 (iv) −2

5. $4x^4-2x^3-2x^2+9x-14$

6. (a) 4, 6 (b) 94, 143

7. $2\frac{9}{14}$

8. (a) $\frac{-25y^4}{27x}$ (b) $18x-14$

9. $2^9\times3^3$; 24

10. $2\frac{6}{11}$

Mid-Year Examination Specimen Paper 1

Part I

1. (a) $2\frac{4}{9}$ (b) $6\frac{17}{18}$

2. $36y-151x$

3. (a) 47, 50 (b) 96, 145

4. (a) 0 (b) −3

5. 2

6. (a) (i) 27 (ii) 27·0
(b) 200

7. 0·769

9. (a) $\frac{5}{6}, \frac{11}{13}, \frac{8}{9}$ (b) 111, 119

10. (a) 336 (b) 6

11. 12 yr, 18 yr

12. $\frac{5}{8}$ **13.** 4 h

14. $\frac{4}{15}x+1\frac{7}{15}$

15. $340, $1 870

Part II

1. (a) 5 (b) $\frac{7}{30}$

2. (a) *T* (b) *F* (c) *F*
(d) *T* (e) *T*