

Answers

Chapter 1

Exercise 1A

1a $8g$ **b** $17x$ **c** d
d $4x^2$ **e** $9c^2$ **f** $-3r^3$
g $-3m$ **h** $8t$ **i** $12v^2$

2a $7w+2$ **b** $5q-8$
c $15a+1$ **d** $3x^2+4y$
e $4b^2+a$ **f** $-3n^3+2m$
g $-12x^2-y$ **h** $8a^2-b$
i $4z^2+9y$

3a $-4u^4+6u^2+9$ **b** $7q^3-3q^2$
c b^2 **d** $3x^3+x^2$
e $2p^2+2p$ **f** $2w^2-2w$
g c^2+4c+2 **h** k^3-k^2+3
i $-2y^2+y-5$

4a $\frac{5+y}{7}$ **b** $\frac{3-x}{4}$
c $\frac{2w+4}{5}$ **d** $\frac{8-5t}{9}$

5a $\frac{2m}{5}$ **b** $\frac{y}{7}$ **c** $\frac{5x}{3}$
d $\frac{2b}{11}$ **e** $\frac{3d}{3}=d$ **f** $\frac{5n}{13}$
g $\frac{11b}{2}$ **h** $\frac{w}{6}$

6a $\frac{3x}{4}$ **b** $\frac{5y}{8}$
c $\frac{21m}{10}$ **d** $\frac{3r}{8}$
e $\frac{12x}{14}=\frac{6x}{7}$ **f** $\frac{7b}{6}$
g $\frac{3h}{20}$ **h** $\frac{5p}{12}$

7a $\frac{10k}{12}=\frac{5k}{6}$ **b** $\frac{22x}{24}=\frac{11x}{12}$
c $\frac{4y}{10}=\frac{2y}{5}$ **d** $\frac{10c}{6}=\frac{5c}{3}$

8

+	x^2	$3x^2-2x$	x^2+x
$3x^2$	$4x^2$	$6x^2-2x$	$4x^2+x$
$6x$	x^2+6x	$3x^2+4x$	x^2+7x
x^2-2x	$2x^2-2x$	$4x^2-4x$	$2x^2-x$
$-2x$	x^2-2x	$3x^2-4x$	x^2-x

9 $2x^2+4x$
10 $500-6y^2-3y$
11 $4x^2+x+6y$

12a $\frac{7k}{12}$ **b** $\frac{17b}{24}$ **c** $\frac{17r}{6}$
d $\frac{39r}{70}$ **e** $\frac{23n}{30}$ **f** $\frac{7d}{24}$
g $\frac{11a}{30}$ **h** $\frac{29y}{44}$

13a $\frac{11m}{12}$ **b** $\frac{21x}{20}$
c $\frac{42m}{30}=\frac{7m}{5}$ **d** $\frac{37h}{84}$

14a $\frac{21+y}{7}$ **b** $\frac{10-x}{2}$
c $\frac{57m}{7}$ **d** $\frac{7y}{9}$
e $\frac{14y-1}{3}$ **f** $\frac{11x-2}{4}$
g $\frac{12a+7}{6}$ **h** $\frac{w-3}{20}$

Exercise 1B

1a $15w$ **b** $24p$
c $120f$ **d** $8xy$
e $-9mn$ **f** $-105kr$
g $36gh$ **h** $21n^2$
i $150a^2$

2a m^7 **b** $3y^8$
c $8z^5$ **d** $48y^4$
e $6a^7$ **f** $8w^{15}$
g $14s^6t^7$ **h** $5p^3q^5$
i $-12c^8d^{10}$

3a $10a^9$ **b** $-12x^{12}$
c $36y^9$ **d** m^4n^7
e $14a^4b^5$ **f** $8c^3d^8e^2$

4a $4w$ **b** $9c^2$ **c** $-8s^2$
d 4 **e** $-5h$ **f** $3y$
g a **h** $2m$ **i** $-4z^2$

5a y^5 **b** $12b^6$ **c** $-3x$
d $2m^4$ **e** $-3t^9$ **f** $-b^4$
g $\frac{2}{3}d^{13}$ **h** $\frac{4}{3}q^2$ **i** $\frac{3}{2}e^2$

6a $6w^4$ **b** $5y^{10}$ **c** $3x^3$
d $-14a^4$ **e** $-8c^{14}$ **f** $-28e^6$

7a $2a$ **b** $4t$ **c** 8
d $-\frac{ab}{6}$ **e** n^4 **f** $\frac{x^7y}{6}$
g $-\frac{y^4}{8}$ **h** $\frac{7d^5}{e}$ **i** $\frac{x^2}{2y^2}$

8a x^{12} **b** s^6
c $9y^2$ **d** $64n^9$
e $-a^{20}b^{10}$ **f** $625r^8t^4$
g $a^{12}b^{11}$ **h** $1296e^{10}f^{31}$
i $864a^{11}b^{18}$

9a 1 **b** 1 **c** 5
d 7 **e** a **f** 1
g -10 **h** 1 **i** 7

10a $16q^5$ **b** $-8u^7$
c $24a^8$ **d** $7x^4$
e $2m^7$ **f** $-d^8$
g $125g^{12}$ **h** $c^{20}d^8$
i $64x^{18}y^6$ **j** 20
k 1 **l** 3

11

×	x^2	$(-3x^4)$	$4xy^3$
$2x^2$	$2x^4$	$-6x^6$	$8x^3y^3$
$(-5x^3y^5)$	$-5x^5y^5$	$15x^7y^5$	$-20x^4y^8$
$7x^5y^8$	$7x^7y^8$	$-21x^9y^8$	$28x^6y^{11}$

12

÷	$(-2a^2)$	ab^2	$3a^2b^2$
$6a^4$	$-3a^2$	$\frac{6a^3}{b^2}$	$\frac{2a^2}{b^2}$
$(-3a^5b^2)$	$\frac{3}{2}a^3b^2$	$-3a^4$	$-a^3$
$12a^6b^4$	$-6a^4b^4$	$12a^5b^2$	$4a^4b^2$

13a $\frac{32y^2}{3}$ **b** $\frac{12d^2}{5}$ **c** $\frac{10w^2}{9}$
d 15 **e** 1 **f** $\frac{10w^2}{63}$
g $\frac{15a}{2}$ **h** $\frac{2m^2}{45}$ **i** $\frac{c}{3e}$

14a $4m^{13}$ **b** $-14x^{11}$ **c** $45y^{10}$

15 $\frac{x}{2y}$

16 $\frac{15x^3}{2}$

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17a $8x^4$ **b** $\frac{5a^6}{2}$ **c** $\frac{7v^8}{4}$

d $20x^4y$ **e** m^3n^2 **f** $\frac{4e^7}{3f^4}$

g $25a^2b$ **h** $\frac{m^9}{45}$ **i** $\frac{c^2d^3}{7e^3}$

18a $\frac{15h^2k^2}{4}$ **b** u^2v

c $\frac{a^2b^2}{2}$ **d** $18m^2n$

e $\frac{3m^2}{4}$ **f** $\frac{1}{6y^2}$

19a $\frac{3x^4y}{z^2}$ **b** m^2np^2

c $2a^3c^2$ **d** $\frac{c^2d^2}{2}$

e $\frac{-24w}{u^4}$ **f** $\frac{16c^2d^5}{e^2}$

Exercise 1C

1 Did not multiply –2 by 3. The correct answer is $9x - 6$

2a $3a + 6$ **b** $2d + 2$

c $7b - 14$ **d** $6x + 8$

e $10x - 14$ **f** $36b + 4$

g $20 + 8t$ **h** $6 - 12w$

i $15 + 45d$ **j** $40e - 16d$

k $20a + 45b$ **l** $14h + 56g$

3a $-4x - 12$ **b** $-3y - 15$

c $-b - 8$ **d** $-7k + 14$

e $-6w + 6$ **f** $-2x + 26$

g $-8 - 4q$ **h** $-15 + 20r$

i $14s - 56$

4a $y^2 + y$ **b** $v^2 + 4v$

c $n^2 + 10n$ **d** $2x^2 - 3x$

e $3e^2 + 5e$ **f** $6d^2 - 2d$

g $7ez + 3fz$ **h** $2ab - 3ac$

i $cd + 4ce$

5a $6g + 2$ **b** $8s + 14$

c $y - 27$ **d** $x + 8$

e $8z - 2$ **f** $-4q + 35$

6a $6x + 1$ **b** $25y - 16$

c $9b - 4$ **d** $9r + 2$

e $5n - 2$ **f** $4q - 7$

7a $4y + 12$ **b** $2c + 2$

c $5a - 15$ **d** $-9e^2 - 12$

e $-8b^2 + 4$ **f** $-24g^2 - 18$

8a $k^2 + 3k$ **b** $2b^2 - 6b$

c $-3y^2 + 5y$ **d** $4x^2 - x$

e $-ab - 4ac$ **f** $5pq - 3pr$

9a $7x - 3$ **b** $5y + 8$

c $8a + 22$ **d** $13c - 9$

e $10s + 34$ **f** $9h + 21$

g $10x$ **h** $2z + 59$

i $7c - 41$ **j** $21g + 3$

k $13u - 18$ **l** $-7d + 10$

10 Did not apply the minus sign when multiplying –2 by 3. The correct answer is $18x - 12 - 2x - 6 = 16x - 18$

11a $2x^2 - 3x$ **b** $2b^2 + 4b$

c $2y^2 + 5y$ **d** g^2

e $7v^2 - 3v$ **f** $b^2 - 3b$

g $3u^2 + 5u$ **h** $3n^2 - 25n$

i $5d^2 + 26d$ **j** $-6e^2 + 65e$

k $7k^2 - 15k$ **l** $-10t^2 + 19t$

12 $a^2b^2 - 5ab$

13a $2x^3 + 3x^2 - 2x - 2$

b $a^3 + 2a^2 - 4a - 12$

c $5y^3 + 2y^2 - 3y - 21$

d $-3b^3 - b^2 + 7b$

e $z^3 - 2z^2 - z$

f $-2e^3 - 7e^2 + 7e$

g $5x$

h $3a^3 + 3a$

i v

j $a^3 + a^2b - ab - b^2$

k $x^4 + x^2y - x^2 - 3xy$

l $y^3 + 4y^2z - yz^2 - y$

14a $5m^6 + m^2$

b $2x^6 - 6x^5 + 8x^4$

c $a^{12} - 3a^8 - 2a^4$

15a $21a^6 - 10a^4 + 7a^3$

b $9x^5 - 35x^2$

c $-6n^3 + 3n^2r$

16a $2b^2$ **b** $\frac{3r^4}{4}$ **c** $\frac{1}{8b}$

Exercise 1D

1a 10.0 cm **b** 13.0 cm

c 26.0 mm **d** 22.4 mm

e 4.9 cm **f** 83.1 cm

2a 9.00 cm **b** 14.70 cm

c 11.53 mm **d** 21.17 mm

e 4.21 cm **f** 10.42 cm

3a $y = 55$ mm **b** $a = 55$ mm

c $x = 23$ mm **d** $d = 25$ mm

e $b = 62$ mm **f** $m = 14$ mm

4 9.0 m

5a $x = 126.00$

b $y = 5.74$, $x = 8.31$

6a $x = 3.6$ cm, $y = 1.7$ cm

b $x = 21.1$ cm

Exercise 1E

1a 21.6 cm **b** 41.2 m

c 59.0 m

2 49.2 m

3a 40.0 m **b** 12.4 cm

c 26.5 mm

4 43.69 cm

5a 18.8 m **b** 12.6 cm

c 88.0 mm

6a 25.1 cm **b** 119.4 m

c 213.6 mm **d** 157.1 mm

e 69.1 m **f** 18.8 cm

7a 25.7 m **b** 10.8 m **c** 41.1 m

8a 25.00 m **b** 10.71 mm

c 33.56 cm

9a 36 m **b** 16 m **c** 47 cm

d 22 m **e** 24 m **f** 23 m

10 28 cm

11a 8.49 cm **b** 28.97 cm

Exercise 1F

1a 149.5 m^2 **b** 4 cm^2

c 19.5 mm^2 **d** 72.2 m^2

e 100.8 mm^2 **f** 40.4 m^2

2a 37.2 cm^2 **b** 71.7 m^2

c 198 m^2 **d** 70 mm^2

e 14 m^2 **f** 21 cm^2

3 42 cm^2

4 11 046 m^2

5 154 cm^2

6a 5.8 km^2 **b** 82.8 cm^2

c 15.0 mm^2 **d** 31.8 cm^2

e 75 mm^2 **f** 120 m^2

7 7 m^2

8 49 m^2

9 30 tiles

10a 1380 cm^2 **b** 36 cm^2

c 134 cm^2

11 50 cm^2

12 42 cm^2

13a 253 m^2 **b** \$5060

14a 8 cm **b** 6 cm

c 148.5 cm^2

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15 50.27 mm^2

16a 5.66 m **b** 80 m^2

17a 32 cm^2 **b** 8

c 6.87 cm^2

Exercise 1G

1a \$5850 **b** \$910

c \$37 000 **d** \$1134

e \$15 225

2a \$600 **b** \$1089

c \$5020 **d** \$10 005

e \$11 518.75

3a 1.2% **b** 0.4%

c 2.4% **d** 3.6%

4a \$8 **b** \$144

c \$1440 **d** \$900

5 \$55 200

6 \$69.75

7a \$22 000 **b** \$122 000

8 \$24

9 \$5040

10a \$7680 **b** \$7560 **c** \$7200

11 Computer application

12 \$71.75

13 \$40 000

14 7.5%

15 $3\frac{1}{3}$ years

16a \$51 000 **b** \$2000

Exercise 1H

1a \$899.89 **b** \$11 578.20

c \$15 577.17 **d** \$27 621.40

2a \$10 063.79 **b** \$102 028.69

c \$1307.84 **d** \$23 509.61

3 \$27 209.78

4 \$12 107.45

5 \$2536.50

6 \$6433.75

7a \$20 766.90 **b** \$7266.90

8 \$39 604.68

9 \$53 608.98

10 \$49 662.32

11 Computer application

12 \$2340.76

13 Investment 2 by \$80

Exercise 1I

1a

Score	Tally	Freq
20	𝍸	3
21	𝍸 𝍸	7
22	𝍸 𝍸	6
23	𝍸	4
24	𝍸	2

b 21 **c** 22

2a

Number of calls	Tally	Freq
0	𝍸 𝍸	7
1	𝍸 𝍸 𝍸	12
2	𝍸 𝍸	8
3	𝍸	4
4	𝍸	2
5	𝍸	1

b 1 **c** 2 **d** 27

3

Score	Tally	Freq
0	𝍸 𝍸	6
1	𝍸 𝍸	7
2	𝍸 𝍸	6
3	𝍸	5
4	𝍸	3
5	𝍸	2
6	𝍸	1

4

Score	Tally	Freq
7	𝍸	3
8	𝍸 𝍸	7
9	𝍸	4
10	𝍸	3
11	𝍸	2
12	𝍸	1

5

Score	Tally	Freq
91	𝍸	4
92	𝍸	5
93	𝍸	3
94	𝍸	4
95	𝍸	3
96	𝍸	3
97	𝍸	5
98	𝍸	3

6a

Score	Tally	Freq
1	𝍸 𝍸 𝍸	11
2	𝍸 𝍸	9
3	𝍸	5
4	𝍸 𝍸 𝍸	11
5	𝍸 𝍸	6
6	𝍸 𝍸	9

b 51

c 31

d 1 and 4

e No: Small sample accounts for the difference in frequencies OR Yes: There is a notable difference between the frequency of the outcomes.

7a

Score	Tally	Freq
32	𝍸 𝍸	6
33	𝍸	5
34	𝍸 𝍸	9
35	𝍸 𝍸	8
36	𝍸 𝍸	8
37	𝍸 𝍸	6
38	𝍸 𝍸	9

b 51 **c** 20

d 34 and 38 s **e** 29.41%

Answers

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8a

Score	Tally	Freq
1	𝍸	4
2	𝍸	4
3	𝍸 𝍸	11
4	𝍸	2
5	𝍸	8
6	𝍸	6
7	𝍸	4
8	𝍸	3
9	𝍸	5
10		0
11		0
12	𝍸	1

b 3 letters

c Small amount of data indicates that the conclusions are not reliable. However, a word length of 3 occurs significantly more often than any other word length.

Exercise 1J

1a 9 **b** 28 **c** 8
d 5 **e** 7 **f** 42
g 11 **h** 14
2a 14.0 **b** 7.0 **c** 9.5
d 9.5 **e** 11.0 **f** 2.2
g 10.2 **h** 8.8
3a 1406 **b** 70.30 **c** 69.95
4a 9 **b** 7 **c** 34
d 1100 **e** 2 **f** 100
g 1 **h** 10
5a 7 **b** 16 **c** 20.5
d 12 **e** 120 **f** 3
g 50 **h** 10.5
6 16
7a 13 **b** 5 **c** 9 **d** 39
8a 17 **b** 7 **c** 26 **d** 24
9a 25 **b** 19 **c** 22
d 4 **e** 22
10a 16 **b** 13 **c** 3 **d** 14
11a 7.89 **b** 7 **c** 4
12 1.96
13 15

Review 1

Multiple-choice

1 D **2** D **3** A **4** B **5** D
6 B **7** B **8** D **9** C **10** C

Short-answer

1a $6ab^3$ **b** $8x^2 - 2x$
c $2m^2 + 12m$
2a $\frac{7x}{3}$ **b** $\frac{37b}{15}$ **c** $\frac{3y}{4}$
3a $15m^5$ **b** $12y^6$
c $\frac{3y}{2}$ **d** 7
e x^{12} **f** $16x^4y^6$
4a $2x - 2y^2$
b $6w + 36m$
c $-24a^2 + 8b^2$
d $-8a + 3b$
e $9y + 21$
f $c^5 + 4c^3d$
5a 35.00 **b** 15.65
c 38.47
6a 26.2 cm **b** 69.1 cm
c 40.0 m
7a 27.0 m^2 **b** 17.5 m^2
c 125.4 cm^2 **d** 47.0 cm^2
e 28.0 mm^2 **f** 3.0 m^2
8 $300
9a $135 061 **b** $151 497
10a 11 **b** 40
11a 12 **b** 16

Extended-response

12 $64 286
13a

Class	Freq.
4–8	5
9–13	6
14–18	8
19–23	4
	23

b 12 **c** 21.7%

Chapter 2

Exercise 2A

1a $1782 **b** $3563 **c** $7721
2a $1108, $2217
b $1509, $3019
c $2073, $4146
d $851, $1702
3 $1656
4a $30 160 **b** $39 520
c $39 216 **d** $125 736
5a $3000 **b** $78 000
6 $41 860
7 $81 120
8 Stephanie $49 348.00, Tahlia $45 852.00; Stephanie by $3496.00
9 Laura $32 110.00, Ebony $29 508.00; Laura by $2602.00
10 Tran $98 696.00, Jake $99 960.00; Difference $1264.00
11a $892.50 **b** $943.50
c $1020.00 **d** $1071.00
12 $1130.50
13a $444.00 **b** $351.50
c $858.40 **d** $511.71
14a $15 787.20 **b** $31 720.00
c $39 062.40 **d** $24 731.20
15a 40.50 hours **b** $911.25
16 42 hours
17 9 hours
18a $193.60 **b** $968.00
c $1936.00 **d** $50 336.00
19 Alyssa $332.10, Connor $320.00; Alyssa by $12.10
20 $635 481.60
21 $83 790.00
22 Computer application
23 $1777.58. Calculations for weekly pay are incorrect as not every month has 4 weeks.
$1640.85
24 18.75 hours

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Exercise 2B

1a $1092.00 **b** $897.75
c $1862.00 **d** $966.00
e $1176.00
2a $1421.00 **b** $791.00
c $784.00 **d** $1074.85
3 $3564.95
4 $2326.50
5a $2901.60 **b** $2896.20
c $2065.80 **d** $2943.90
e $2214.50 **f** $2055.00
6 $222
7 $5810.95
8 $542
9 Computer application
10a $1424.00 **b** $35.60
11a $1400.00 **b** $980.00
c $73 528.00
d Pay increases by $728; however, the holiday loading was $980.

Exercise 2C

1a $108.00 **b** $237.00
c $379.20 **d** $262.98
2a $227.94 **b** $114.30
c $292.68 **d** $370.74
3 $1560.00
4 $135.30
5 $1023.40
6a 45.5 hours **b** $1041.60
7 $9.80
8 $16.00
9 $1000.68
10 $1237.50
11a $257.50 **b** $1287.50
12 $820.88
13 $1761
14 $3589.60
15 $2212
16 $3720
17 $451.05
18 $680.00
19a $448.00 **b** $268.80
c 37.5%
20 5.89 hours
21a $453.60 **b** 4 hours
c $22.68 **d** $567.00

Exercise 2D

1a $352.80 **b** $669.60
c $1368.80
2a $9120.00 **b** $8400.00
c $5710.00 **d** $11 814.00
3 $1620.00
4a $431.00 **b** $642.00
c $1640.00
5 $960.00
6a $512.00 **b** $500.00
7a $1000, $3250
b $1000, $4500
c $1000, $5750
d $1000, $7000
8 $50 600.00
9a $3400.00 **b** $4700.00
c $5200.00
10 2%
11 $460.00
12a $11 600.00 **b** $41 600.00
c $2260.00 **d** $1220.00

Exercise 2E

1a $2250 **b** $3870 **c** $2880
2 $5140
3 $500
4 $4473.60
5a $13 096.32 **b** $36 864.00
c $15 712.35
6a $12 105.60 **b** $9240.40
7a $87 62.00 **b** $18 312.84
c $28 580.76
8a $58.20 **b** $97.00
c $107.60 **d** $165.80
9a $142.80 **b** $156.40
c $154.20 **d** $103.20
10a $1005.00 **b** $595.00
11 $358.20
12a 11 240 copies
b $42 065.70
c $37 859.13
13 $832.00

Exercise 2F

1a $165 **b** $330
c $45 **d** $68
e $128
Allowable deduction $736
2 $1591
3 $4614
4a i $2349.60 **ii** $844.80
iii $3022.80 **iv** $1544.40
v $2049.30 **vi** $3960.00
b i $2610.00 **ii** $773.40
iii $3300.00 **iv** $2400.00
v $48.00 **vi** $416.40
5 $5107.20
6a $24 000 **b** $48 000
c $72 000 **d** $96 000
7 $1890
8a $775.50 **b** $519.59
c $348.12
9 $47 160
10a $115.20 **b** $67.20
c $54.72 **d** $915.20

Exercise 2G

1a $78 880 **b** $74 429
c $79 280 **d** $59 896
e $75 795 **f** $66 406
g $71 480 **h** $60 110
i $49 440
2 $64 378
3a $3200 **b** $72 280
4a $89 164 **b** $1140
c $88 024
5a $2210 **b** $61 410
6a $58 240 **b** $56 780
7a $64 642 **b** $60 322
8a $72 280 **b** $301
c $824 **d** $71 456
9a $99 580 **b** $224.40
c $1964.40 **d** $97 615.60

Exercise 2H

1a $511.00 **b** $720.00
c $493.00
2a $407.40 **b** $1419.60
c $962.73
3a $15 892.00 **b** $32 858.00
4a $1689.95 **b** $3850.70
c $4003.61
5 $79 485.00

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6a $464.75 **b** $343.75
7a $9.60 **b** $310.40
c $16 140.80
8a $1434.00 **b** $258.12
c $129.06 **d** $542.18
e $891.82
9a $1120.00 **b** $168.00
c $100.80 **d** $363.80
e $756.20
10a $1976.00 **b** $177.84
c $1769.71
11a $984.40 **b** 33.0%
12a $2420.10 **b** $1210.05
c 24.7% **d** $2400.00
13a $2403.00 **b** $1259.40
c 17%

Exercise 2I

1a B **b** A **c** C
d D **e** E **f** C
g C **h** D **i** A
2a $532 **b** $2717
c $15 922 **d** $32 994
e $76 732 **f** $17 547
3 $1862
4 $28 702
5a 19 cents **b** $3572.33
c $19 822.37
6a $460.00 **b** $1770.82
c $812.00 **d** $938.12
e $1356.00 **f** $4011.84
g $3406.00 **h** $315.80
i $1812.80
7a $511.10 **b** $15 585.95
c $3836.55 **d** $30 515
e $61 625.50 **f** $8905.25
8a $1951.50 refund
b $96.16 owing
9a $42 540 **b** $5372.50
c $432.50
10a $147 500
b $42 207
c $44 720
d Refund of $2513
11a $41 535.08 **b** 28.5%
12a $1128 **b** $11 005
13a $2496 **b** $36 304
14 Computer application
15a $21 660 **b** $18 297.75
c Refund of $3362.25
d 22.2%
16a $1275 **b** $5611.38
17 $59 670

Review 2

Multiple-choice

1 B **2** B **3** C **4** A **5** D
6 D **7** A **8** B **9** B

Short-answer

1a $1855.20 **b** $38.65
2 $5371.25
3a $839.16 **b** $5634.36
4 $641.25
5a $4725.00 **b** $235 275.00
6 $4440
7a $31 461.46 **b** $26 742.24
8 $1056.00 **9** $5.35
10 $5773 **11** $77 520
12a $1270.50 **b** $2579.50
13a $96 720 **b** $493
c $3230 **d** $93 490
14 $37 519.10
15 $747.50

Extended-response

16a $513 **b** $102.60
17a $25 480
b $27 136.90
c He pays another $1656.90 in tax.
d 25.4%

Chapter 3

Exercise 3A

1a 19 **b** 19 **c** 7
d 25 **e** −96 **f** $\sqrt{24}$
g 48 **h** 2 **i** 3
2a 25 **b** 10 **c** 0
d −25 **e** 4 **f** 7
3a −2 **b** 6 **c** 97
d 1 **e** −2 **f** 1
g $-2\frac{3}{4}$ **h** 6.61 **i** $-2\frac{24}{25}$
4a 11 **b** 56 **c** 92
d 0.88 **e** $2\frac{5}{9}$ **f** $1\frac{3}{8}$
5a 16 **b** 98 **c** −300
d 2 **e** −45 **f** 14.0625
g $\frac{7}{250}$ **h** $-\frac{27}{128}$ **i** 0.07
6a 2 **b** 5 **c** 2
d 3 **e** 1 **f** 8
g 0.25 **h** $1\frac{3}{4}$ **i** $\frac{1}{25}$
7a 2 **b** 4 **c** 3 **d** 1
8a 485 **b** −153 **c** $\sqrt{48}$
d 11 **e** 25 **f** $\frac{10}{49}$
9 150.8 cm^2 **10** 64
11 3 **12** 2.35 **13** 3.24
14 8 **15** 0.008
16 9.20 **17** 6

Exercise 3B

1a 90 km/h **b** 97 km/h
c 80 km/h **d** 84 km/h
e 96 km/h **f** 48 km/h
2a 168 km **b** 392 km
c 146 km **d** 70 km
e 196 km **f** 154 km
3a 2 h **b** 2.5 h **c** 2.5 h
d 5 h **e** 6 h **f** 8 h
4 227.27 km/h
5a 70 km **b** 0.9 h
c 77.78 km/h
6a 45 minutes **b** 64 km/h
7a 25 m **b** 20 m **c** 45 m
8a 47 m **b** 49 m
9a 12 m **b** 25 m
c 43 m **d** 66 m
e 94 m **f** 126 m
10a No. Stopping distance is 15 m.
b Sarah would hit the child at a greater speed.
11a 89.510 m **b** about 90 m
12a 81 km/h **b** 63 km/h
c 48 km/h **d** 115 km/h
13a 34 km **b** 2 km
c 91 km **d** 272 km
14a 5 h 29 min **b** 50 min
c 5 h 6 min **d** 9 h 21 min
e 20 min **f** 1 h 40 min

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15a 1224 km/h **b** 102 km
c 0.34 km **d** 48 min
16a 169 km/h **b** 5 h 55 min
17a

Speed (km/h)	Reaction distance (m)
10	2.1
20	4.2
40	8.3
80	16.7

b Yes. Table shows the reaction distance doubles when the speed doubles.

18a

Speed (km/h)	Braking distance (m)
10	0.60
20	2.35
40	9.41
80	37.65

b Yes. Table shows the braking distance quadruples when the speed doubles.

19a $t = \frac{18}{5V}\left(d - \frac{V^2}{170}\right)$
b 0.6 s **c** 1.8 s **d** 3.0 s

20a

Reaction time (s)	Reaction distance (m)
0.50	8
1.00	17
1.50	25

b Reaction distance increases when the reaction time increases.

Exercise 3C

1a $a = 8$ **b** $y = 11$
c $x = 10$ **d** $g = 7$
e $w = -4$ **f** $z = -13$
g $b = 9$ **h** $m = 18$
i $c = 21$ **j** $q = 7$
k $h = 6$ **l** $n = -5$

2a $n = 3$ **b** $x = 5$
c $c = -4$ **d** $b = 7\frac{1}{2}$
e $m = -5\frac{1}{4}$ **f** $b = -4\frac{1}{6}$
g $s = 16$ **h** $y = 30$
i $a = -77$ **j** $g = 24$
k $c = 45$ **l** $k = -9$

3a Error is in the second line.
b $6y = 2$ or $y = \frac{1}{3}$

4a $w = 5$ **b** $t = 3$ **c** $x = 4$
d $y = -1$ **e** $m = -1$ **f** $a = 7$
g $e = 4$ **h** $b = 1$ **i** $k = -5$
j $w = 3$ **k** $d = -1$ **l** $z = -6$

5a $q = \frac{13}{3} = 4\frac{1}{3}$
b $r = \frac{25}{4} = 6\frac{1}{4}$
c $x = \frac{3}{2} = 1\frac{1}{2}$
d $a = \frac{27}{4} = 6\frac{3}{4}$
e $m = \frac{1}{5}$
f $k = -\frac{17}{2} = -8\frac{1}{2}$
g $c = \frac{13}{2} = 6\frac{1}{2}$
h $e = \frac{16}{5} = 3\frac{1}{5}$
i $p = \frac{15}{6} = 2\frac{1}{2}$
j $r = \frac{9}{2} = 4\frac{1}{2}$
k $w = \frac{44}{3} = 14\frac{2}{3}$
l $c = \frac{8}{9}$

6a $d = \frac{5}{12}$ **b** $y = 1\frac{2}{5}$
c $a = \frac{2}{3}$ **d** $x = 9\frac{2}{3}$
e $b = 7\frac{1}{5}$ **f** $n = 36\frac{1}{4}$

7a $z = 10$ **b** $c = 4$
c $m = 36$ **d** $x = 3\frac{8}{9}$
e $y = 16\frac{4}{5}$ **f** $a = 20$

8a $\frac{a}{4} + 20 = 27$ **b** $a = 28$

9a $g = 16$ **b** $y = 36$
c $c = 50$ **d** $x = -49$
e $b = 4$ **f** $w = 37\frac{1}{2}$

10a $m = 2$ **b** $t = 4$ **c** $e = -4$
d $x = -1\frac{1}{3}$ **e** $d = 6$ **f** $w = -1$
g $a = 3\frac{1}{2}$ **h** $g = 6\frac{1}{5}$ **i** $r = 5$

11a $a = 16$ **b** $z = 12\frac{1}{3}$
c $r = \frac{1}{2}$ **d** $x = -2\frac{5}{6}$
e $b = 2$ **f** $w = -\frac{1}{6}$

12a $d = 5$ **b** $x = -8$
c $a = -4$ **d** $y = 1$
e $m = -3\frac{4}{5}$ **f** $c = 1\frac{5}{6}$
g $s = -\frac{2}{7}$ **h** $z = 2\frac{1}{2}$
i $b = 1$ **j** $x = -\frac{1}{3}$
k $a = 1$ **l** $w = 2\frac{1}{2}$

13a $x = -4\frac{1}{5}$ **b** $w = 7\frac{1}{5}$
c $y = -\frac{2}{11}$ **d** $e = -3\frac{1}{3}$
e $m = -\frac{2}{19}$ **f** $b = -1\frac{1}{14}$
g $r = -1\frac{2}{3}$ **h** $t = 1\frac{2}{13}$
i $n = -1\frac{8}{13}$

14a $3c + 15 = 261$ **b** Cost is \$82
15 Number is -5
16a $v = 12$ **b** $a = 14\frac{2}{7}$
c $x = 13\frac{1}{3}$ **d** $m = 52\frac{1}{2}$
e $b = 84$ **f** $g = 96$
g $y = 3\frac{3}{5}$ **h** $c = 2\frac{10}{13}$
i $h = 40$ **j** $n = 56$
k $p = -20$ **l** $z = \frac{10}{21}$

17a $x = \frac{1}{3}$ **b** $a = -\frac{5}{6}$
c $y = \frac{2}{5}$ **d** $d = -1$
e $c = 1\frac{1}{7}$ **f** $m = \frac{1}{2}$

18a $b = -\frac{2}{5}$ **b** $y = \frac{1}{7}$
c $y = 3$ **d** $x = -3$
e $c = -\frac{1}{2}$ **f** $m = -5\frac{1}{2}$

19a $2x + 6 = x + 2$ **b** $x = -4$
20a $x + 8 = 2x - 6$ **b** $x = 14$

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21a $d = -\frac{3}{5}$ **b** $r = -18$

c $x = -1\frac{7}{9}$ **d** $a = 5\frac{3}{5}$

e $m = -\frac{2}{5}$ **f** $y = 2$

22a $a = 1\frac{3}{4}$ **b** $m = 3\frac{2}{3}$

c $y = -1$ **d** $b = -14$

e $x = -4$ **f** $c = 5\frac{1}{2}$

g $n = 9\frac{1}{2}$ **h** $k = 8\frac{3}{4}$

i $p = 36\frac{1}{2}$

Exercise 3D

1a $A = 113.1$ **b** $A = 804.2$

c $A = 7238.2$

2a $A = 157.08$ **b** $A = 1036.73$

c $A = 75.40$

3a $I = 6.0$ **b** $I = 18.0$

c $I = 50.4$

4a $A = 11.49$ **b** $A = 6.75$

c $A = 10.13$

5a $S = 20.0$ **b** $S = 2.5$

6a $V = 905$ **b** $V = 589$

c $V = 1499$

7a $z = 2$ **b** $z = 4.875$

8a \$1050 **b** \$1112.50

c \$1500

9a 16°C **b** 27°C **c** 38°C

10 $r = 4.14$ cm

11a 540 000 km **b** 3 780 000 km

c 196 560 000 km

12 $V = 9$ volts

13 $n = 60$

14 $h = 4.5$ cm

15 $t = 7.75$

16 $b = 28.72$ mm

17 $s = -13.5$

18 $n = 2$

19 $R_1 = 1.40$

20 $FV = \$27\,160.56$

21 $PV = \$5006$

22 $a = 3\frac{1}{2}$

23 $h = 20$

24 $c = 3.6$

25 $s = 592.5$

26 $A = 0.7$

27 $V = 268\text{ cm}^3$

Exercise 3E

1a $x = y - 3$ **b** $x = \frac{y}{5}$

c $x = y + 7$ **d** $x = \frac{y - 9}{2}$

e $x = 4 - y$ **f** $x = \frac{y + 7}{3}$

2a $x = 8y$ **b** $x = 2(y - 1)$

c $x = 3(y + 1)$ **d** $x = 6(7 - y)$

e $x = 5(y - 5)$ **f** $x = -3(y + 2)$

3a $t = \frac{d}{s}$ **b** $s = \frac{d}{t}$

c 64 km/h

4a $l = \frac{A}{b}$ **b** $b = \frac{A}{l}$

c $b = 6.4$ cm **d** $l = 2.625$ cm

5a $m = \frac{F}{a}$ **b** $a = \frac{F}{m}$

c $a = 4$ **d** $m = 4.5$

6a $b = a - c$ **b** $b = \frac{a + c}{6}$

c $b = a - c$ **d** $b = \frac{a - 2c}{6}$

e $b = \frac{4a + c}{7}$ **f** $b = 8a - 3c$

g $b = \frac{a + c}{-2}$ or $b = \frac{-a - c}{2}$

h $b = \frac{a + c}{5}$ **i** $b = \frac{a + 4c}{9}$

7a $b = y - mx$ **b** $m = \frac{y - b}{x}$

c $x = \frac{y - b}{m}$ **d** $x = 3$

e $m = 4$

8a $l = \frac{P}{2} - b$ **b** $l = 25$ m

c $b = \frac{P}{2} - l$

9a $a = \frac{w}{35} - 1.5b - 2c$

b $b = \left(\frac{w}{35} - a - 2c\right) \div 1.5$

c $c = \left(\frac{w}{35} - a - 1.5b\right) \div 2$

d $c = 5.25$

10a $b = \frac{A}{\pi a}$ **b** $b = 2.07$ cm

11a $x = \pm\sqrt{y}$ **b** $x = \pm\sqrt{\frac{y - 4}{3}}$

c $x = \pm\sqrt{\frac{5 - y}{4}}$ **d** $x = y^2$

e $x = \frac{y^2}{49}$ **f** $x = \frac{(y - 7)^2}{4}$

12 $p = \pm\sqrt{\frac{4m - 5n}{2}}$

13a $h = \frac{V}{\pi r^2}$ **b** $r = \sqrt{\frac{V}{\pi h}}$

c $r = 1.69$ cm

14 $r = \sqrt{\frac{A}{4\pi}}$

15a $m = Bh^2$ **b** $h = \sqrt{\frac{m}{B}}$

c i $h = 1.82$ m

ii $h = 1.84$ m

16 $M = FV\left[\frac{r}{(1 + r)^n - 1}\right]$

17a $L = 9.8T^2$

b $L = 156.8$ metres

18 $\cos C = \frac{a^2 + b^2 - c^2}{2ab}$

19a $r = \sqrt[3]{\frac{3V}{4\pi}}$ **b** $r = 1.24$ m

20 $L = \pm\frac{\sqrt{Z^2 - R_2}}{2\pi f}$

21 $A = P(r + 1)^n$

Exercise 3F

1a 0.09 **b** 0.07 **c** 0.10

d 0.10 **e** 0.28 **f** 0.17

2a 0.02 **b** 0.10 **c** 0.01

d 0.20 **e** 0.16 **f** 0.04

3a 0.09 **b** 0.11

c about 6 hours

4a 3 h 44 min **b** 8 h 12 min

c 5 h 48 min **d** 10 h 12 min

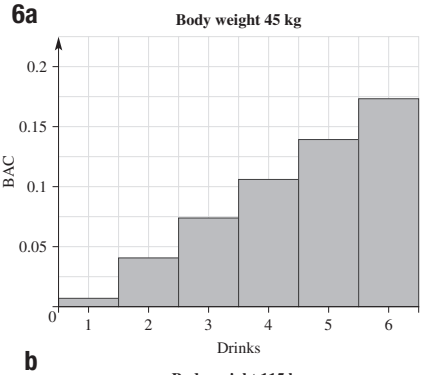
e 6 h 8 min **f** 11 h 28 min

5a 4 h 56 min **b** 1 h 56 min

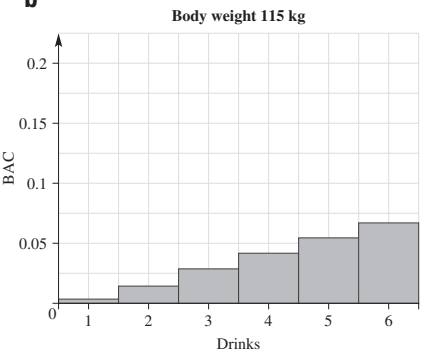
c 11 h 28 min **d** 1 h 52 min

e 3 h 20 min **f** 20 min

6a



b



7a 1.4 **b** 8.0 **c** 1.5

d 0.9 **e** 0.6

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8a 0.075 h **b** 0.045 h
9a 3 h 5 min **b** 5 h 45 min
10a 3.2 **b** 6.8
11a Male – 4.7, Female – 7.6
b Males are larger in size.

Exercise 3G

1 120 mg
2a 50 **b** 150
c 12.5 days
3a 5 mg **b** 40 mg **c** 1800 mg
4a 0.6 mL **b** 0.8 mL
c 2 mL **d** 1.6 mL
5a 3 mL **b** 6 mL
c 2 mL **d** 10 mL
6a 11 mL **b** 4 mL
c 2 mL **d** 7 mL
7a 187.5 mL/h **b** 400 mL/h
8a 1.5 tablets **b** 2.25 tablets
9a 12.5 mL **b** 12 mL
10a 25 mL **b** 8 doses
c 2 days
11a 150 mL/h
b 2.5 mL/min
c 3000 drops/h
d 50 drops/min

Review 3

Multiple-choice

1 C **2** C **3** A **4** D
5 C **6** B **7** D **8** D

Short-answer

1a 44 **b** 102
2 87.96 cm
3a 510 km **b** 38.25 L **c** \$58.14
4a 39 m **b** 29 m
5a $e = 8$ **b** $b = 4\frac{1}{2}$
c $w = 9$ **d** $n = 6$
e $a = 5$ **f** $q = 4$
g $h = 98$ **h** $d = \frac{7}{10}$
i $y = \frac{1}{2}$
6a $p = -8$ **b** $s = -1\frac{4}{5}$
c $p = 2$ **d** $d = \frac{6}{7}$
e $y = -1$ **f** $a = -\frac{4}{9}$
7a $c = 6\frac{1}{2}$ **b** $x = 1\frac{1}{2}$ **c** $u = 1$
8a $A = 1.47$ **b** $A = 2.34$
c $A = 4.57$
9a $m = 2.6$ kg **b** $v = 3.138$ m/s
10 $\sin C = \frac{2A}{ab}$
11a $s = \frac{v^2 - u^2}{2a}$
b $u = \pm\sqrt{v^2 - 2as}$
12a 0.084 **b** 5.6 hours

Extended-response

13a 1.5 h
b Anna – 15 km, Bridget – 18 km
14a $C = 120 + 65h$ **b** \$380

Chapter 4

Exercise 4A

1a 50 **b** 7800
c 2000 **d** 89000
e 570 **f** 600000
g 9.4 **h** 60
i 81 **j** 0.49
k 22 **l** 5.1
2a 3000 **b** 45000
c 76000 **d** 8100000
e 4000000 **f** 520
g 6.8 **h** 9.3
i 45 **j** 0.3
k 2.3 **l** 60
3a 2000 **b** 12000
c 9000000 **d** 7800000
e 50000 **f** 300000000
g 6.1 **h** 0.4
i 0.21 **j** 0.08
k 0.079 **l** 8
4a Centimetre **b** Metre
c Millimetre **d** Kilometre
e Centimetre **f** Metre
5a Tonne **b** Gram
c Kilogram **d** Kilogram
e Tonne **f** Gram
6a 19.25 L **b** 50
7 2495000 m
8 2.2 kg
9 12 t
10 5.625 kg
11 23.4 g
12 10750 g
13 3068 kg
14 7.25 kg
15a 159 km **b** 19.875 L
16 12 km
17a 4 **b** 40
18a 0.005 km, 5000 cm, 500 m, 5 000 000 mm
b 5 000 000 mm, 500 m, 5000 cm, 0.005 km
19a 1000000 **b** 1000000
c 100 **d** 0.1
e 20 **f** 0.005
g 39000 **h** 310000000
i 4700000 **j** 0.0743
k 65 **l** 0.4
20a 0.08 **b** 8
21a 1.5 km **b** 50

Exercise 4B

1a A = 10 mm, B = 44 mm, C = 72 mm, D = 89 mm
b 1 mm
c 0.5 mm
d A Lower limit = 9.5
A Upper limit = 10.5
B Lower limit = 43.5
B Upper limit = 44.5
C Lower limit = 71.5
C Upper limit = 72.5
D Lower limit = 88.5
D Upper limit = 89.5
e A ± 0.050
B ± 0.011
C ± 0.007
D ± 0.006
f A – 5.0%
B – 1.1%
C – 0.7%
D – 0.6%
2a A – 1.82 kg, B – 4.24 kg

Answers

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b 0.02 kg
c 0.01 kg
d A Lower limit = 1.81
A Upper limit = 1.83
B Lower limit = 4.23
B Upper limit = 4.25
e $A \pm 0.005, B \pm 0.002$
f A 0.5%, B 0.2%

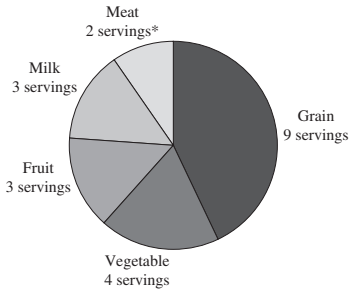
3a 0.40 kg **b** 0.008 **c** 0.80%
4a 16 g **b** 0.068 **c** 6.81%
5a 0.29 kg **b** 0.097 **c** 9.667%
6a 0.15 m **b** 0.006 **c** 0.6%
7a 0.3 m
b 0.2 m
c Cooper – 0.0053
Filip – 0.0036
d Cooper – 0.534%
Filip – 0.358%

Exercise 4C

1a 7.6×10^3 **b** 1.7×10^9
c 5.9×10^5 **d** 6.8×10^6
e 3.5×10^4 **f** 3.1×10^8
g 7.71×10^7 **h** 5.23×10^{11}
i 9.54×10^{10} **j** 5.4×10^2
2a 5.6×10^{-4} **b** 6.87×10^{-5}
c 8.12×10^{-7} **d** 4.3×10^{-3}
e 5.8×10^{-5} **f** 3.12×10^{-6}
g 2.6×10^{-1} **h** 9.2×10^{-2}
i 1.67×10^{-10} **j** 6.0×10^{-5}
3 5.0×10^{-6} s
4a 4.10×10^8 **b** 4×10^8
5a 112 000
b 534 000 000
c 5200
d 86 780 000
e 240
f 7 800 000 000
g 3 900 000
h 28
i 64 000
j 35 000
6a 0.00035
b 0.0000079
c 0.000000163
d 0.00581
e 0.049
f 0.98
g 0.0000000412
h 0.0000633
i 0.000000003
j 0.000000007134
7 5.81×10^{-6} kg
8a 1.475×10^{10} **b** 2.961×10^8
c 2.982×10^{-6} **d** 1.86×10^{-8}
9a 3.25×10^7 **b** 1.5×10^{10}
c 1.5×10^1
10a 1 600 000 **b** 3 678 000
c 789 000 **d** 3 000 000
e 778 000 **f** 3 194 700
g 821 100 **h** 7000
i 49 000
11a 0.004 **b** 0.1918
c 0.00159 **d** 0.111222
e 0.00003 **f** 0.019833
g 0.0081 **h** 0.0927
i 0.00042
12 0.000016 m
13 270 000 000 cg
14 4240 g
15a 2 880 000 **b** 0.00004802
16 4×10^8
17a 1.5×10^8 **b** 1.2×10^{-5}
18a $\pm 262\,000$ **b** ± 2.43
19 13 920
20 3×10^8 m/s
21 2×10^6
22 2.76×10^{13}
23 9.4×10^8 km

Exercise 4D

1a 1883 kJ **b** 7531 kJ
c 63 597 kJ **d** 1816 Cal
e 88 Cal **f** 299 Cal
2a 2793 kJ **b** 3251 kJ
c 1743 kJ **d** 2035 kJ
e 2549 kJ
3a 4 **b** 3
c Fruit and milk **d** Fruit
e Milk **f** 2
4a 52.8 g
b i 95 kJ
ii 475 kJ
iii 4180 kJ
c i 2090 kJ
ii 418 kJ
iii 20.9 kJ
d 16 720 kJ **e** 74
f 1% **g** 1.5625%
h 180 **i** 16.7%
j 26.4%
5a 21
b



c 43%
d 33%
e 3729 kJ
f 3500 kJ

Exercise 4E

1a 21 Sep **b** $349.22
c 10 Oct **d** $31.74
e $281.11 **f** $32.54
g 10.28%
2a $45.01
b $49.83
c $54.65
3a 16 kWh **b** $3.79
4a 12.6 kWh **b** $2.85
5a 12 kWh **b** $2.74
6 $1.03
7a $137.01 **b** $208.36
c $385.37
8a 1.5 kWh **b** 500 Wh
c 30 h **d** 12.5 h

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9a $92.72 **b** $107.53
c 5.9% **d** 3600 MJ
e 1930 MJ **f** $122.32

Review 4

Multiple-choice

1	D	**2**	A	**3**	B	**4**	C	**5**	B
6	D	**7**	D	**8**	D	**9**	C	**10**	B

Short-answer

1 6.246 tonnes
2a 0.05
b 400 000
c 3 000 000
3a 0.1 m
b 1.2 m
c 0.299%
4a 4 800 000
b 0.000 625
c 725 760
5a 5.08×10^4
b 3.6×10^{-3}
c 3.81×10^8
6a 1.512×10^{10}
b 2.0×10^6
c 7×10^{-3}
7 3.6×10^{12}
8 2.3×10^6
9a 2947 kJ
b 3869 kJ
c 2562 kJ
10a 4
b kWh
c 8 kWh
d 12 kWh
e April
f October
g July

Extended-response

11a 0.6 kWh
b 600 Wh
c 40 h

Chapter 5

Exercise 5A

1a Certain **b** Impossible
c Impossible **d** Certain
e Impossible **f** Certain
g Certain **h** Impossible
i Certain **j** Certain
2a Certain **b** Even
c Unlikely **d** Unlikely
e Even **f** Likely
g Even **h** Unlikely
i Even **j** Certain
3a Likely **b** Unlikely
4a Unlikely **b** Even
c Unlikely
5a Even **b** Certain
c Certain **d** Unlikely
6a {H, T}
b {R, R, W, W, W}
c {A, U, S, S, I, E}
d {1, 2, 3, 4, 5}
e {B, G}
f {Win, Draw, Loss}
7a {B, B, R, B, R} **b** 5
c Unlikely **d** Likely
8a $\{1, 2, 3, 4, 5, 6\}$ **b** 6
9a {A, B, C, D, E, F, G, H, I, J}
b Unlikely
10a {Win, Draw, Loss}
b 3
c No. Less chance of a draw
11a {Win, Draw, Loss}
b No. Jacob does not have the same chance of winning the match as the Australian champion.
12a Even **b** Unlikely
c Unlikely **d** Likely
e Likely
13a 0.50 **b** 0.75 **c** 1
d 0.90 **e** 0 **f** 0.25
14a $\{\$10, \$10, \$10, \$10, \$20, \$20, \$50, \$50, \$50\}$
b 3
c $\{\$10, \$10, \$10, \$20, \$20, \$50, \$50, \$50\}$
d $\{\$10, \$10, \$10, \$10, \$20, \$50, \$50, \$50\}$
e $\{\$10, \$10, \$10, \$10, \$20, \$20, \$50, \$50\}$
15a Even **b** Impossible
c Unlikely **d** Even
16 False. Not all the outcomes are equally likely.
17a {Laura, Mia, Emma}
b No. Laura has an 80% chance of winning.
c 10%

Exercise 5B

1a $\frac{1}{4}$ **b** $\frac{2}{7}$ **c** $\frac{1}{2}$
d $\frac{5}{26}$ **e** $\frac{1}{6}$ **f** $\frac{1}{5}$
2a $\frac{5}{8}$ **b** $\frac{3}{8}$ **c** $\frac{5}{8}$
3a $\frac{1}{5}$ **b** $\frac{13}{20}$ **c** $\frac{3}{20}$ **d** $\frac{4}{5}$
4 $\frac{1}{2}$
5 $\frac{1}{3}$
6a $\frac{1}{3}$ **b** $\frac{4}{9}$ **c** $\frac{2}{9}$ **d** $\frac{2}{3}$
7a $\frac{1}{52}$ **b** $\frac{1}{4}$ **c** $\frac{1}{2}$
d $\frac{3}{26}$ **e** $\frac{1}{13}$ **f** $\frac{1}{52}$
g $\frac{5}{13}$ **h** $\frac{3}{13}$ **i** $\frac{1}{26}$
8 Disagree. Depends on the location and the season.
9a $\frac{1}{2}$ **b** $\frac{7}{8}$ **c** $\frac{5}{16}$
d $\frac{1}{4}$ **e** $\frac{15}{16}$ **f** $\frac{1}{4}$
10a $\frac{1}{8}$ **b** $\frac{3}{8}$ **c** $\frac{1}{2}$
d $\frac{1}{4}$ **e** 1 **f** $\frac{1}{4}$
11a $\frac{1}{24}$ **b** $\frac{1}{24}$
c $\frac{23}{24}$ **d** $\frac{23}{24}$
12a $\frac{1}{17}$ **b** $\frac{1}{17}$ **c** $\frac{1}{51}$
d $\frac{4}{51}$ **e** $\frac{4}{17}$ **f** $\frac{11}{51}$

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13a $\frac{1}{4}$ **b** $\frac{3}{4}$ **c** $\frac{1}{2}$ **d** $\frac{1}{24}$

14 False. Not all outcomes are equally likely.

Exercise 5C

1a

	Boy	Girl
Boy	BB	BG
Girl	GB	GG

b 4

2a

+	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

b 36

3a

+	M1	M2	M3	M4
E1	E1M1	E1M2	E1M3	E1M4
E2	E2M1	E2M2	E2M3	E2M4
E3	E3M1	E3M2	E3M3	E3M4

b 12

4a

	D	E
A	AD	AE
B	BD	BE
C	CD	CE

b 6

5 8

	D	E	F	G
X	XD	XE	XF	XG
Y	YD	YE	YF	YG

6a

	Y1	Y2	Y3	G1
Y1	Y1Y1	Y1Y2	Y1Y3	Y1G1
Y2	Y2Y1	Y2Y2	Y2Y3	Y2G1
Y3	Y3Y1	Y3Y2	Y3Y3	Y3G1
G1	G1Y1	G1Y2	G1Y3	G1G1

b i $\frac{1}{16}$ **ii** $\frac{1}{16}$ **iii** $\frac{9}{16}$

7a

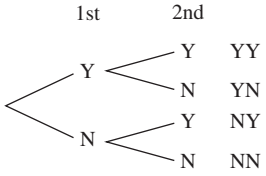
	K	Q	J
K	KK	KQ	KJ
Q	QK	QQ	QJ
J	JK	JQ	JJ

b i $\frac{1}{9}$ **ii** $\frac{1}{9}$ **iii** $\frac{4}{9}$

8a {HH, HT, TH, TT}

b i $\frac{1}{4}$ **ii** $\frac{1}{4}$ **iii** $\frac{1}{2}$

9



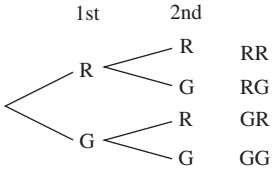
10a {TTT, TTF, TFT, TFF, FTT, FTF, FFT, FFF}

b 8

c i $\frac{1}{8}$ **ii** $\frac{3}{8}$ **iii** $\frac{7}{8}$

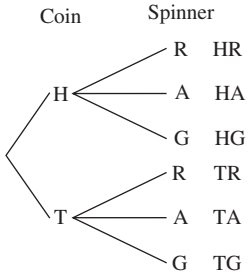
11a {12, 13, 21, 23, 31, 32} **b** $\frac{1}{6}$

12a



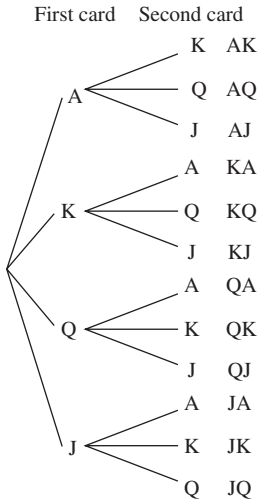
b $\frac{1}{2}$

13a

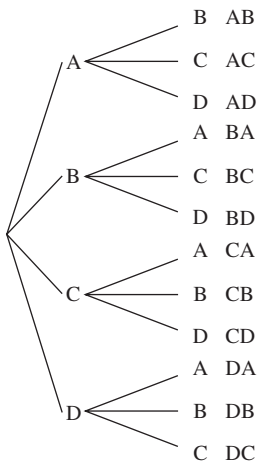


b $\frac{1}{3}$

14

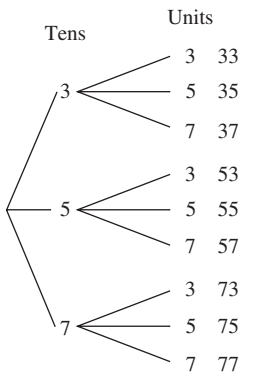


15a



b $\frac{1}{2}$

16a



b $\frac{2}{3}$

17a $\frac{5}{13}$ **b** 75% **c** $\frac{1}{4}$

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Exercise 5D

1a $\frac{3}{10}$ **b** $\frac{7}{15}$ **c** 0
d 1 **e** $\frac{7}{30}$

2a $\frac{57}{100}$ **b** $\frac{2}{25}$ **c** $\frac{7}{20}$

3a $\frac{5}{8}$ **b** $\frac{3}{8}$

4a 0.25 **b** 0.15
c 0.40 **d** 1

5 15%

6a 1 **b** 0.7 **c** 0.6

7a $\frac{23}{65}$ **b** $\frac{7}{18}$
c $\frac{11}{30}$ **d** $\frac{337}{585}$
e $\frac{203}{390}$ **f** $\frac{869}{1170}$

8a 0.51 **b** 0.49 **c** 0.50
d 0.47 **e** 0.26 **f** 0.53

9 $\frac{1}{3}$

10 $\frac{33}{56}$

11 $\frac{13}{20}$

12a i $\frac{3}{5}$ **ii** $\frac{3}{10}$ **iii** $\frac{1}{5}$
iv $\frac{3}{5}$ **v** $\frac{4}{5}$ **vi** $\frac{1}{5}$
b i 2 **ii** 4 **iii** 1
iv 1 **v** 2
c Parramatta

Exercise 5E

1a Selecting a red card from a normal pack of cards
b Not winning first prize in Lotto
c Throwing an odd number when a die is rolled
d Obtaining a head when a coin is tossed
e Drawing club, diamond or heart from a normal pack of playing cards
f Choosing a blue or red ball from a bag containing a blue, red and green ball

2a $\frac{4}{5}$ **b** 0.1
c 38% **d** 3 : 4
e $\frac{8}{11}$ **f** 0.55
g 62.5% **h** 4 : 7

3a 0.71 **b** $\frac{71}{100}$

4 0.4 **5** $\frac{4}{15}$

6a $\frac{3}{8}$ **b** 0.375 **c** 37.5%

7a $\frac{3}{4}$ **b** $\frac{9}{11}$
c $\frac{7}{9}$ **d** $\frac{40}{99}$
e $\frac{17}{36}$ **f** $\frac{259}{396}$
g $\frac{137}{396}$ **h** $\frac{25}{44}$

8a $\frac{12}{13}$ **b** $\frac{25}{26}$

9a $\frac{6}{7}$ **b** $\frac{5}{7}$

10a 0.9 **b** 0.85
c 0.09 **d** 1
e 1 **f** 1
g 0.25 **h** 0.75

11a 92% **b** 93%
c 90% **d** 17%
e 18% **f** 75%

12a $\frac{13}{16}$ **b** 6

Exercise 5F

1a $\frac{2}{7}$ **b** $\frac{3}{14}$
c $\frac{5}{14}$ **d** $\frac{1}{7}$

2a 0.118 **b** 0.294
c 0.412 **d** 0.176

3a 10.5% **b** 21.0%
c 14.5% **d** 17.0%
e 21.5% **f** 15.5%

4a 20% **b** 30%
c 10% **d** 15%
e 25%

5a $\frac{1}{3}$ **b** $\frac{5}{6}$
c $\frac{1}{2}$ **d** $\frac{1}{8}$

6a 10% **b** 75%
c 37.5% **d** 80%

7 Investigation
8 Investigation
9 Investigation
10 6.25%
11 0.96
12 $\frac{71}{134}$

13a 20 times
b Die has nearly twice the outcomes for data values 1 and 6. It appears to be biased.

14 Computer application

15a $\frac{28}{73}$
b Collecting and using data from more than one year.

16a 4 **b** 0.25 **c** 20

17 Investigation
18 Investigation
19 Investigation

Exercise 5G

1 18
2 624
3 2

4a 198 **b** 27

5 117
6 21

7a $\frac{1}{6}$ **b** 80
c $\frac{1}{2}$ **d** 240
e $\frac{2}{3}$ **f** 320
g $\frac{1}{3}$ **h** 160

8a $\frac{1}{25}$ **b** 8
c $\frac{1}{25}$ **d** 8
e $\frac{8}{25}$ **f** 64

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9a $\frac{1}{3}$ **b** 10
c $\frac{1}{6}$ **d** 5
e $\frac{2}{3}$ **f** 20

10a 192 **b** 160
c 96 **d** 64
e 96 **f** 96

11 Computer application

12a 30 **b** 90
c 90 **d** 30

13a 169 **b** 16
c 144 **d** 1024

14a 4 **b** 4 **c** 36

Exercise 5H

1a i O–, A– **ii** O–, B–
iii O–, B–, A–, AB–
iv O–
v O–, O+, A–, A+
vi O–, O+, B–, B+
vii O–, O+, B–, B+,A–, A+, AB–, AB+
viii O–, O+
b O– **c** O+, B–, A–
d AB+ **e** O–
f AB+, B+

2a 45–64
b 18–24
c 8%
d People over 65 are more likely to be ill, and in low-income countries many people die before 65.

3a 3.33% **b** 820 000
c 256 667 **d** 175 000
e 1 417 000

4a 9265 **b** 4905
c 1090 **d** 545

5a 2.4 **b** 561 700
c 1 101 372
d 3.9 million. Not believable, because one patient often needs many donations' worth of blood products.

Review 5

Multiple-choice

1 B **2** C **3** C
4 C **5** A **6** D
7 C **8** B **9** B

Short-answer

1a Impossible
b Unlikely
c Unlikely

2a {2, 4, 6, 8, 10}
b {a, e, i, o, u}
c {W, W, W, B, B, B, B}

3 132

4a $\frac{1}{50}$ **b** $\frac{1}{2}$ **c** $\frac{19}{50}$
d $\frac{2}{5}$ **e** $\frac{1}{5}$ **f** $\frac{7}{50}$

5 $\frac{1}{2}$

6a $\frac{1}{4}$ **b** $\frac{1}{2}$ **c** 1

7a $\frac{4}{9}$ **b** $\frac{1}{3}$ **c** $\frac{7}{9}$

8a $\frac{1}{8}$ **b** $\frac{1}{4}$ **c** 0
d $\frac{1}{4}$ **e** $\frac{1}{2}$ **f** $\frac{1}{2}$

9a $\frac{2}{5}$ **b** 1 **c** $\frac{1}{5}$

10a 0.125 **b** 0.5
c 0.875 **d** 0.125
e 0.625 **f** 0.375

11a $\frac{32}{35}$ **b** $\frac{3}{35}$
c $\frac{2}{7}$ **d** $\frac{4}{5}$

12a $\frac{12}{13}$ **b** $\frac{3}{4}$ **c** $\frac{25}{26}$

13a 0.20 **b** 0.24
c 0.32 **d** 0.24

14 0.58
15 2
16 336

Extended-response

17a $\frac{19}{33}$ **b** $\frac{14}{19}$

Chapter 6

Exercise 6A

1a 50.3 m^2 **b** 63.6 cm^2
c 16.6 mm^2 **d** 65.0 mm^2
e 113.1 cm^2 **f** 95.0 mm^2

2a 1963.50 mm^2 **b** 28.27 cm^2
c 314.16 m^2 **d** 254.47 m^2
e 7542.96 cm^2 **f** 6.16 mm^2

3a 172.8 mm^2 **b** 40.8 m^2
c 31.0 m^2 **d** 75.4 cm^2
e 173.6 m^2 **f** 31.2 mm^2

4a 103.67 m^2 **b** 84.67 cm^2
c 62.83 cm^2 **d** 386.42 mm^2

5 680.9 cm^2

6 50 cm^2

7a 14.1 cm^2 **b** 34.0 cm^2
c 47.1 mm^2 **d** 12.6 cm^2
e 94.4 mm^2 **f** 24.0 m^2

8a 32.95 cm^2 **b** 13.62 cm^2
c 88.51 mm^2 **d** 49.31 cm^2
e 4.13 m^2 **f** 164.70 cm^2

9 151 cm^2

10a 864 mm^2 **b** 491 mm^2

11 32.3 m^2

12 1.3 m

13 415 m^2

14 10 m

15a 120° **b** 10°

16 $6761

Exercise 6B

1a 52 cm^2 **b** 864 m^2 **c** 29 m^2
d 138 m^2 **e** 14 mm^2 **f** 117 cm^2

2 38 m^2

3 124 cm^2

4 88 cm^2

5 7.7 cm^2

6a 1950 m^2 **b** 1200 m^2
c 3800 m^2 **d** 7350 m^2
e 7992 m^2 **f** 1767 m^2

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7a 1767 m^2 **b** 37 m
8a 345 m^2 **b** 2046 m^2
c 297 m^2 **d** 3350 m^2
e 6038 m^2
9a 5 mm **b** 39.3 mm^2
c 99.3 mm^2
10a 180 cm^2 **b** 78.54 cm^2
c 101.46 cm^2
11a 113.10 cm^2 **b** 30.90 cm^2
12a 35 m **b** 8748.5 m^2
13 53.54 cm^2
14a 128 cm^2 **b** 2 **c** 27.47 cm^2
15a $A = lb + \frac{1}{2}\pi r^2 = 2xy + \frac{1}{2}\pi x^2$
b 65 m^2
16 30 pavers
17a 402.1 mm^2 **b** 30 mm
c 882.1 mm^2
18 2293 m^2
19a $A = \frac{1}{8}\pi x^2$
b $A = \frac{1}{8}\pi x^2 - \pi y^2$
c 13 m^2

Exercise 6C

1a 408 m^2 **b** 672 m^2
c 207 m^2 **d** 200 m^2
e 147 m^2 **f** 234 m^2
2a 264 m^3 **b** 1776 m^3
3 288 cm^2
4a 18.6 m^2 **b** 10.2 m^2
5 126 m^2 **6** 125 m^2
7 20.5 m^2 **8** 3400 m^2

Exercise 6D

1a 1200 mm^2 **b** 32 cm^2
c 150 m^2 **d** 150 mm^2
e 66 cm^2 **f** 158 m^2
2a 100 m^2 **b** 408 cm^2
3a 1200 cm^2 **b** 288 mm^2
c 2141.6 m^2 **d** 408 m^2
e 120 m^2 **f** 360 m^2
4a 1226 cm^2 **b** 240 m^2
c 912 cm^2 **d** 218 cm^2
e 530 m^2 **f** 246 cm^2
5a 15 m^2 **b** $4050
6a 720 cm^2 **b** 475.2 cm^2
c 1002.7 cm^2
7 1256 m^2
8a 6 faces **b** 27.04 cm^2
9 8 cm

Exercise 6E

1a 1659 mm^2 **b** 94 cm^2
c 151 m^2
2a 1156.1 mm^2 **b** 458.2 cm^2
c 2596.5 m^2
3a 452.39 m^2 **b** 78.54 mm^2
c 615.75 cm^2
4a 30.41 m^2 **b** 100.53 cm^2
c 226.19 mm^2
5a 461.81 cm^2 **b** 1140.40 m^2
c 28.86 m^2
6a 4.5 cm **b** 395.8 cm^2
c 523.1 cm^2
7a 0.79 m^2 **b** $18.85 **c** $75.40
8 Computer application

Exercise 6F

1a 102.7 mm^2 **b** 84 cm^2
c 256 cm^2 **d** 114.1 cm^2
e 275 m^2 **f** 160 cm^2
2a 5760 cm^2 **b** 11.2 m^2
c 166.4 m^2
3a 118.44 cm^2 **b** 81.27 cm^2
c 63.92 cm^2 **d** 408.82 cm^2
4a 7.4 m^2 **b** 242.5 cm^2
c 3939.6 cm^2
5a 31 m^2 **b** 404 cm^2
c 1009 cm^2
6a 4.2 cm **b** 55.4 cm^2
c 92.4 cm^2 **d** 147.8 cm^2
7a 396 cm^2 **b** 267 cm^2
8a 20 cm^2 **b** 261 cm^2
9 62 cm^2 **10** 160 cm^2
11a 9.5 cm **b** 8.1 cm
c 228.5 cm^2
12 34.6 cm
13a 6.91 cm **b** 85.22 cm
c 85 cm
14a 910 cm^2 (or 911 cm^2 if unrounded values are used in intermediate calculations)
b 728 cm^2
c 589 cm^2 (or 592 cm^2 if unrounded values are used in intermediate calculations)

Exercise 6G

1a 96 m^3 **b** 4400 m^3 **c** 112 m^3
2 165 mm^3 **3** 750 m^3
4a 108 m^3 **b** 5832 cm^3
c 137 344 cm^3
5 307.1 cm^3
6a 450 m^3 **b** 240 mm^3
c 410 cm^3
7 1200 cm^3
8a 1526 cm^3 **b** 446 cm^3
c 13 357 mm^3
9a 600 m^3 **b** 48 m^2
c 480 m^3
10a 15 m^2 **b** 180 m^3
11 38.971 cm^3
12a 280 cm^3 **b** 376 cm^2

Exercise 6H

1a 31 m^3 **b** 1583 mm^3
c 3079 mm^3 **d** 9640 m^3
e 2262 m^3 **f** 226 m^3
2 1570.80 cm^3
3a 524 cm^3 **b** 2145 mm^3
c 1437 cm^3 **d** 22 m^3
e 262 m^3 **f** 1 526 814 mm^3
4 905 mm^3
5a 4.7 m^3 **b** 1352.2 cm^3
c 904.8 cm^3
6a 100π m^2 **b** 800π m^3
7a 502.7 m^3 **b** 10 472 s
8a 6378 km **b** 1.09×10^{12} km^3
9 Four times
10a 3.5 cm **b** 179.6 cm^3
c 808.2 cm^3 **d** 269.4 cm^3
e 33.3%

Exercise 6I

1a 327 m^3 **b** 14 m^3
c 12 m^3 **d** 270 m^3
e 560 m^3 **f** 96 m^3
2a 160 m^3 **b** 2000 mm^3
3 12 cm^3

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4a 236 m^3 **b** 1139 m^3
c 235 m^3
5 296.88 cm^3
6a 48 400 m^2 **b** 1 677 866.67 m^3
7 49.86 cm^3
8a 37.5 cm^2 **b** 150 cm^3
9 800 m^3
10a 785 m^3 **b** 6283 m^3
c 5498 m^3
11 44 cm^3

Exercise 6J

1a $SA = 18\ cm^2, V = 4\ cm^3$
b $SA = 22\ cm^2, V = 5\ cm^3$
c $SA = 24\ cm^2, V = 6\ cm^3$
2a $SA = 1240\ m^2, V = 2394\ m^3$
b $SA = 160\ m^2, V = 112\ m^3$
c $SA = 5212\ cm^2, V = 20\,520\ cm^3$
3a $SA = 201\ m^2, V = 235\ m^3$
b $SA = 138\ mm^2, V = 117\ mm^3$
c $SA = 686\ cm^2, V = 1593\ cm^3$
4a 137.4 cm^2 **b** 77.0 cm^2
c 214.4 cm^2 **d** 153.9 cm^3
e 89.8 cm^3
5a $SA = 861\ cm^2, V = 1960\ cm^3$
b $SA = 97\ m^2, V = 79\ m^3$
c $SA = 156\ m^2, V = 131\ m^3$
6a 4072 cm^3 **b** 2714 cm^3
7 42 667 cm^3
8a 2.36 m^3 **b** 7.5 m^2
c 27.64 m^3
9a First tank is 1.216 m^3
Second tank is 0.955 m^3
b First tank is 7 m^2
Second tank is 6 m^2
10 2 100 000 cm^3

Exercise 6K

1 Four cans with 300 mL remaining.
2a 300 mL **b** 20
c 60 **d** 30
3a 4 **b** 2
c 70 **d** 34
e 900 **f** 0.5
g 43 **h** 30 000
i 103 **j** 7000
k 5 **l** 8 000 000
4 200 mL
5 720 000 L
6 60 mL
7 3 L
8 421.88 mL
9a 96 000 000 mL
b 0.04 mL
c 5.65 mL
d 270 000 000 mL
e 147 000 000 mL
f 471.24 mL
10a 12.6 m^2
b 31.4 m^3
c 31 kL
11a 217.5 m^3 **b** 218 kL
12a 608.5 m^3
b 608.5 kL
c 305 550 L

Review 6

Multiple-choice

1 C **2** B **3** D **4** A **5** D
6 B **7** B **8** C **9** C **10** B

Short-answer

1a 6.2 mm^2 **b** 22.0 mm^2
c 60.4 m^2
2a 628 cm^2 **b** 9425 cm^3
c 9.4 L
3a 48 cm^2 **b** 12 cm^2
c 36 cm^2
4 266 cm^2 **5** 180 m^2
6 603.2 cm^2 **7** 263.89 cm^2
8a 1257 cm^2 **b** 4189 cm^3
9a 144 m^3 **b** 24 mm^3 **c** 1139 m^3
10a 240 m^3 **b** 96 m^3 **c** 144 m^3
11 6 L

Extended-response

12a 140 m^2 **b** 120 m^3 **c** 128 m^2
13a 88 m^3
b 17.6 h (17.7 h if unrounded value in part a is used)

Practice Paper 1

1 B **2** B **3** C **4** C
5 D **6** A **7** A **8** C
9 D **10** B **11** B **12** D
13 B **14** D **15** B
16a i \$1306.60
ii **1** \$681.10 **2** \$4573.10
b i \$59 000 **ii** \$10 722
iii \$1180 **iv** \$11 902
v \$353 refund
c i $-10a - 5$ **ii** $5x^5$
17a i $\frac{7}{13}$ **ii** $\frac{12}{13}$
b 47.71 cm^3 **c** $x = 4$
d i 1658.8 cm^2 **ii** 7
e i $x = 15$ **ii** $x = -0.5$
f 1.08×10^9 km
g 0.010%
18a i $r = \sqrt[3]{\frac{3V}{4\pi}}$ **ii** 0.78 m
b i \$3764.48
ii Heater C, because the room's volume is 81.081 m^3, too big for heaters A or B.
c i 25.45 m^3 **ii** 25 447 L
d 1.23 **e** $x = \frac{y - b}{m}$
f 0.065

Chapter 7

Exercise 7A

1a Sample **b** Census
c Census **d** Sample
e Sample **f** Sample
g Census **h** Census
i Sample **j** Census
2a Systematic **b** Random
c Self-selected **d** Stratified
e Systematic **f** Random
g Systematic **h** Random
i Stratified **j** Random
3 173 **4** 6%
5a 4 **b** 58 **c** 62
6a 200 **b** 22 **c** 28
7a 440 **b** 15 **c** 18
8 36
9a 440
b i 11 **ii** 15 **iii** 13 **iv** 16

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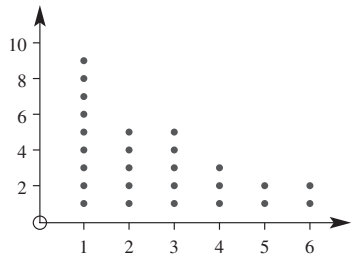
10a 23 **b** 65%
c School population does not represent the views of the entire population.
11 56
12a 13 **b** 12
13a No opportunity to give a reason or state that part of the policy is good.
b Bias, as it states that the boss is lazy. This may not be the interviewee's opinion.
14a Inaccurate. Survey is biased as people at the festival have a liking for country music.
b Systematic survey of people of across NSW.

Exercise 7B

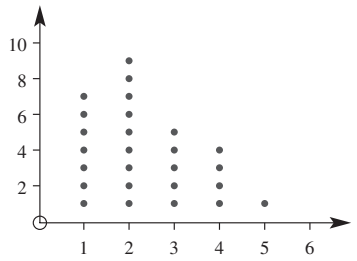
1a Categorical **b** Numerical
c Numerical **d** Categorical
e Numerical **f** Numerical
g Categorical **h** Numerical
i Categorical **j** Numerical
k Numerical **l** Categorical
m Numerical
2a Discrete **b** Discrete
c Continuous **d** Discrete
e Continuous **f** Discrete
g Discrete **h** Continuous
i Continuous **j** Discrete
k Continuous
3a Continuous **b** Continuous
c Categorical **d** Categorical
e Categorical **f** Discrete
g Continuous **h** Discrete
i Categorical **j** Discrete
k Categorical **l** Continuous
m Continuous **n** Discrete
o Continuous **p** Categorical
4a Numerical **b** Continuous
5a Numerical **b** Discrete
6 Categorical and nominal
7 Categorical and ordinal
8 Numerical and discrete
9 Categorical and nominal
10 Numerical and discrete
11 Numerical and continuous
12a Numerical and discrete
b Categorical and ordinal

Exercise 7C

1a 16 **b** 13
c 9 and 16 **d** 332
2a



b 3 **c** 5
3a



b 5 **c** 5
4a 34 **b** 24 **c** 28
d 15 **e** 24
5a

0	4
1	79
2	0124566778
3	00113347
4	016

b 16 **c** 27.5
6a

876554433	0	56
75411	1	24479
1	2	2233689
	3	2

b Australian tourists spent fewer nights away from home in the past year than New Zealand tourists. The median for the Australian tourist is 7 and the New Zealand tourist is 22. New Zealand tourist has a greater spread than the Australian tourist.
7a

9777664	5	58
733	6	1456889
75221	7	123889

b Ages for admission is younger for males than females. The median is 63 for males and 68 for females. The admission age for males has a greater spread than for females.

Exercise 7D

1a

Class	Class centre	Freq.
5–19	12	10
20–34	27	8
35–49	42	6
50–64	57	4
	Total	28

b 10 **c** 5–19 **d** 28
2a

Class	Class centre	Tally	Freq.
3–7	5	IIII	4
8–12	10	𝍸 I	6
13–17	15	II	2
18–22	20	𝍸 II	7
23–27	25	I	1
28–32	30	III	3
33–37	35	𝍸 III	8
38–42	40	𝍸	5

b 8 **c** 23–27 **d** 36
3

Class	Class centre	Tally	Freq.
170–174	172	II	2
175–179	177	II	2
180–184	182	𝍸 𝍸 II	12
185–189	187	𝍸 III	8
190–194	192	𝍸 I	6

4a 0–9, 10–19, 20–29, 30–39 and 40–49
b 4.5, 14.5, 24.5, 34.5 and 44.5

Answers

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c

Class	Class centre	Freq.
0–9	4.5	3
10–19	14.5	11
20–29	24.5	29
30–39	34.5	46
40–49	44.5	1

5a 130–139, 140–149, 150–159, 160–169, 170–179 and 180–189

b 134.5, 144.5, 154.5, 164.5, 174.5 and 184.5

c

Class	Class centre	Freq.
130–139	134.5	2
140–149	144.5	3
150–159	154.5	9
160–169	164.5	16
170–179	174.5	8
180–189	184.5	2

6a 0–9, 10–19, 20–29, 30–39, 40–49, 50–59 and 60–69

b 4.5, 14.5, 24.5, 34.5, 44.5, 54.5 and 64.5

c

Class	Class centre	Freq.
0–9	4.5	7
10–19	14.5	11
20–29	24.5	6
30–39	34.5	3
40–49	44.5	1
50–59	54.5	1
60–69	64.5	1

d 60%

Exercise 7E

1a

Score	Freq	Cum. freq.
4	4	4
5	6	10
6	7	17
7	10	27
8	5	32

b 5 **c** 22 **d** 10 **e** 32

2a

Number of calls	Freq.	Cum. freq.
20	4	4
21	3	7
22	10	17
23	12	29
24	6	35
25	5	40

b 3 **c** 35 **d** 11

3a

Score	Tally	Freq.	Cum. freq.
8	‖	2	2
9	𝍸	5	7
10	𝍸 𝍸 |	11	18
11	𝍸 |	6	24
12	‖	2	26
13	𝍸	4	30

b 30 **c** 11 **d** 5 **e** 10

4a

Score	Tally	Freq	Cum. freq.
4	𝍸	4	4
5	𝍸	4	8
6	𝍸	5	13
7	‖	2	15
8	𝍸	5	20
9	𝍸	5	25
10	𝍸	5	30

b See above

c 30 **d** 5 **e** 5 **f** 22

g 20 **h** 6, 8, 9 and 10

i 7 **j** $\frac{1}{15}$ **k** $\frac{2}{15}$

l 73.33% **m** 26.67%

5a

Score	Tally	Freq.	Cum. freq.
61	𝍸 |	6	6
62	𝍸 𝍸 ‖	13	19
63	𝍸 𝍸 𝍸	14	33
64	𝍸 𝍸	9	42
65	‖	2	44
66	|	1	45

b See above **c** 45

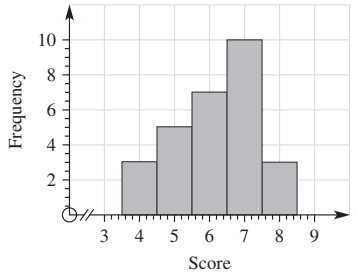
d 6 **e** 33

f $\frac{13}{45}$ **g** 4.44%

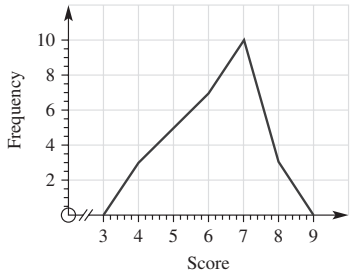
h 93.33%

Exercise 7F

1a



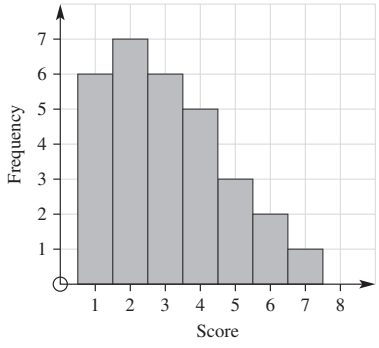
b



2a

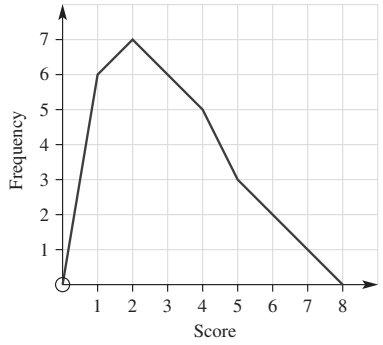
Score	Tally	Freq.
1	𝍸 |	6
2	𝍸 ‖	7
3	𝍸 |	6
4	𝍸	5
5	𝍸	3
6	‖	2
7	|	1

b



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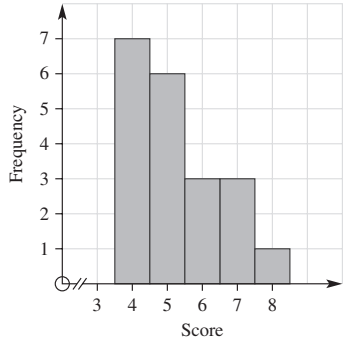
c



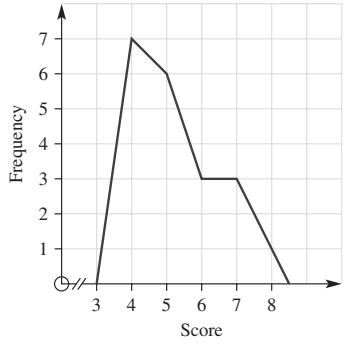
3a

Score	Tally	Freq.
4	IIIIII	7
5	IIIII	6
6	III	3
7	III	3
8	I	1

b



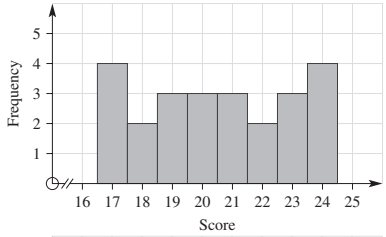
c



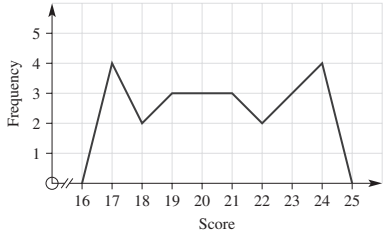
4a

Score	Tally	Freq.
17	IIII	4
18	II	2
19	III	3
20	III	3
21	III	3
22	II	2
23	III	3
24	IIII	4

b



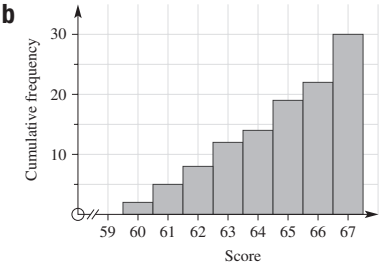
c



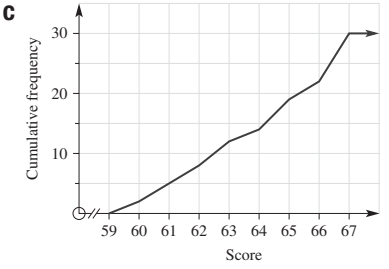
5a

Score	Freq	Cum. freq.
60	2	2
61	3	5
62	3	8
63	4	12
64	2	14
65	5	19
66	3	22
67	8	30

b



c



d 12 days **e** 22 days

6a 10 **b** 90 **c** 50 **d** 50
e 0 **f** 50 **g** 0 **h** 150
i 50 **j** 50 **k** 500

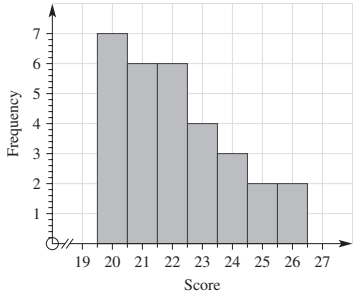
l

Score	Freq	Cum. freq.
10	10	10
20	90	100
30	50	150
40	50	200
50	0	200
60	50	250
70	0	250
80	150	400
90	50	450
100	50	500

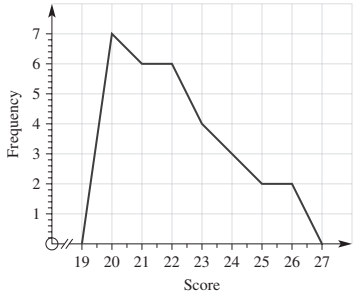
7a

Score	Freq	Cum. freq.
20	7	7
21	6	13
22	6	19
23	4	23
24	3	26
25	2	28
26	2	30

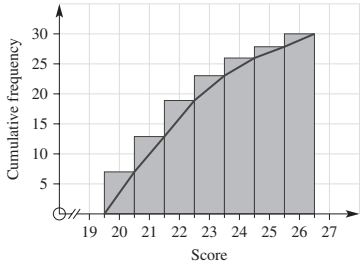
b



c



d



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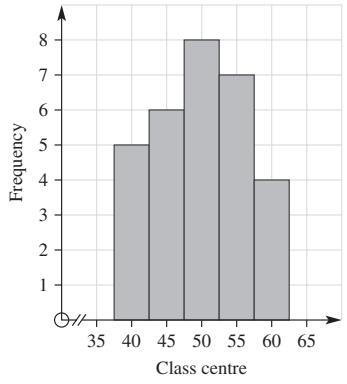
e 22
f $Q_1 = 21$, $Q_3 = 23$
g IQR = 2
8a Suggested classes:
38–42, 43–47, 48–52, 53–57 and 58–62

b

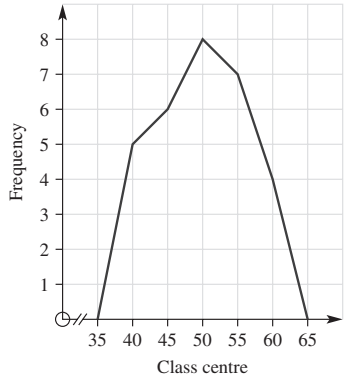
Class	Class centre	Freq.	Cum. freq.
38–42	40	5	5
43–47	45	6	11
48–52	50	8	19
53–57	55	7	26
58–62	60	4	30

c See above

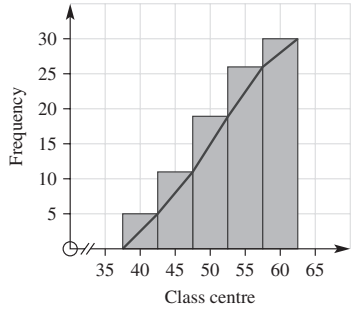
d



e



f



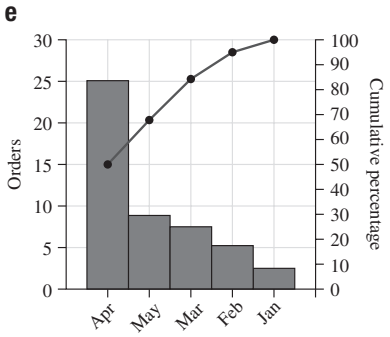
g 50
h $Q_1 = 45$, $Q_3 = 55$
i IQR = 10

Exercise 7G

1a

Month	Freq.	Cum. freq.	Cum. per.
Apr	25	25	50
May	9	34	68
Mar	8	42	84
Feb	5	47	94
Jan	3	50	100

b 5
c Scale 1 to 30 (or 25) with a major guideline of 5.
d Scale 1 to 100 with a major guideline of 10.
e

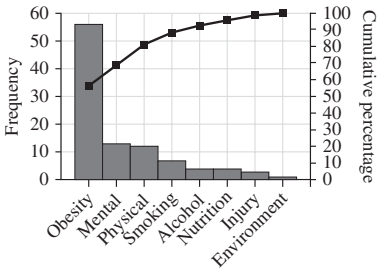


f April and May

2a

Health issue	Freq.	Cum. freq.	Cum. per.
Obesity	56	56	56
Mental health	13	69	69
Physical activity	12	81	81
Smoking	7	88	88
Alcohol	4	92	92
Nutrition	4	96	96
Injury	3	99	99
Environment	1	100	100

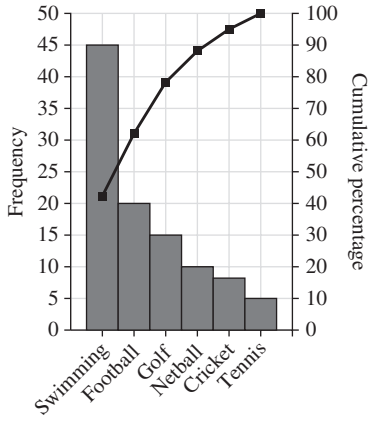
b 8
c Scale 1 to 60 with a major guideline of 10.
d Scale 1 to 100 with a major guideline of 10.
e



f Obesity and mental health
3 Computer investigation
4a

Sport	Freq.	Cum. freq.	Cum. per.
Swimming	45	45	44
Football	20	65	63
Golf	15	80	78
Netball	10	90	87
Cricket	8	98	95
Tennis	5	103	100

b



c Swimming, football and golf

Exercise 7H

1a \$4000 **b** \$1000
c 2.5 years **d** 3.5 years
e About \$1250 **f** About \$2600
2a 3.88 cents per kilometre
b Brand A
c \$734.50
d \$183.00
e \$250.00
3a 4L **b** 11L **c** \$13.05
4a 10 023 **b** 28.1% **c** $\frac{1786}{10\,023}$
d 2005
e January had the most number of accidents (2814). People often go on holidays in January and drive their car.
5a 44 km/h **b** 30 km/h
c 37 km/h **d** 36 km/h
e 36 km/h **f** 14 km/h
6a 6 hours **b** 14
c 276 **d** 12.5
e 12.5 **f** 12

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7a

Class	Class centre (x)	Freq. (f)	$f \times x$
20–29	24.5	85	2082.5
30–39	34.5	72	2484
40–49	44.5	71	3159.5
50–59	54.5	55	2997.5
60–69	64.5	36	2322

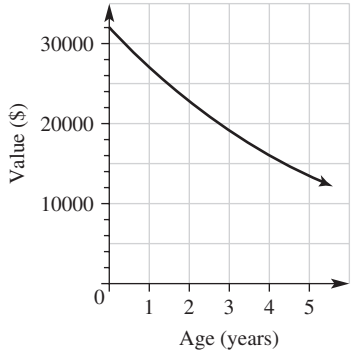
b 319 **c** 41
d 26.65% **e** 28.53%

8a Mean = 1.2, median = 0, mode = 0
b It depends. Mean has been affected by outlier of 6, but even without this outlier the average would still be 1.1 accidents/day. Median gives a good picture of a typical day, but conceals the fact that many days have multiple accidents.

9a $5120
b

Year	Current value	Depreciation	Depreciated value
1	$32 000	$5120	$26 880
2	$26 880	$4301	$22 579
3	$22 579	$3613	$18 966
4	$18 966	$3035	$15 931
5	$15 931	$2549	$13 382

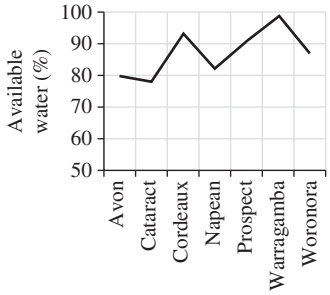
c



Exercise 7I

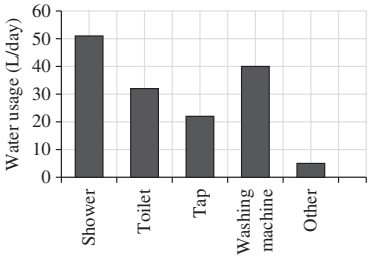
1a 375 mm **b** June
c Year 2 **d** February
2a Warragamba **b** Warragamba
c 117 360 ML **d** 62 457.3 ML
e 2 537 380 ML **f** 362 483 ML

g

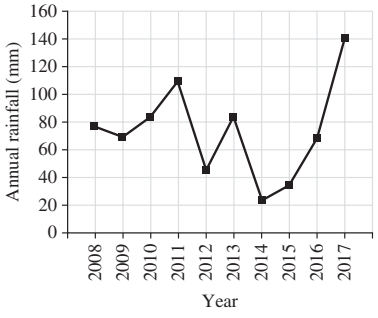


3a QLD **b** WA
c QLD **d** WA

4a 150 L **b** 54 750 L
c 34%
d

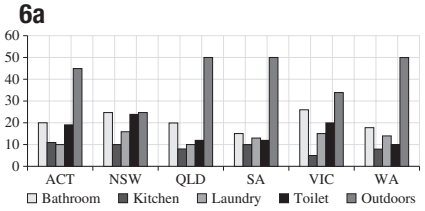


5a 2017 **b** 2014
c Mean = 73.31 mm, median = 73.2
d Range = 118.2
e



f Student opinion. Lowest rainfall occurred in 2014 and 2015. This could be part of the global climate change. However, 2017 had the highest rainfall in January for 10 years.

6a



b



c NSW. Possibly lower use of dual-flush toilets; less use of water outdoors increases the percentage for the other categories.
d QLD, SA and WA. Less rainfall than the other states.
e Kitchen. Water only used in cooking and dishwashing.
f Outdoors. Many gardens require a large amount of water.
g NSW uses a higher percentage of household water in the bathroom and toilet and a lower percentage of household water outdoors.

Review 7

Multiple-choice

1 D **2** C **3** C **4** B
5 B **6** D **7** A **8** A

Short-answer

1a Categorical **b** Categorical
c Numerical **d** Numerical
e Numerical **f** Categorical
g Numerical **h** Numerical
i Numerical

2a 35 **b** 26 **c** 25
3a 18 **b** 8 **c** 22 **d** 22
4a

Class	Class centre	Freq.	Cum. freq.
4–8	6	5	5
9–13	11	6	11
14–18	16	8	19
19–23	21	4	23
	Total	23	

b 23 **c** 12 **d** 48%

5a 60% **b** 2011
c Single-flush toilets are decreasing in popularity and being replaced with dual-flush toilets.
d 12.8 million

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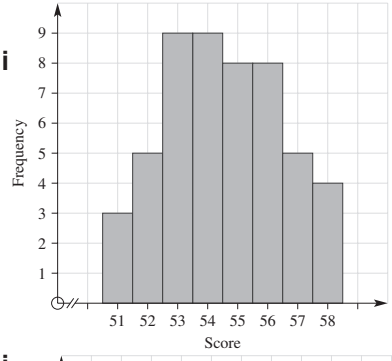
Extended-response

6a

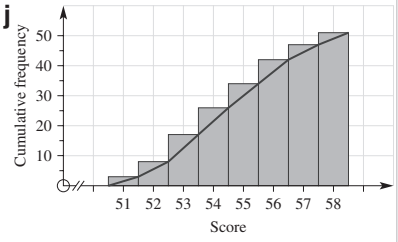
Score	Tally	Freq	Cum. freq.
51	𝍸	3	3
52	𝍸	5	8
53	𝍸 𝍸	9	17
54	𝍸 𝍸	9	26
55	𝍸 𝍸	8	34
56	𝍸 𝍸	8	42
57	𝍸	5	47
58	𝍸	4	51

b 51 **c** 26
d See above **e** 51 min
f 53 and 54 **g** 7
h 54

i



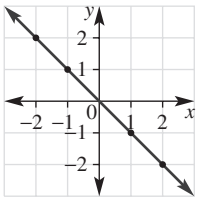
j



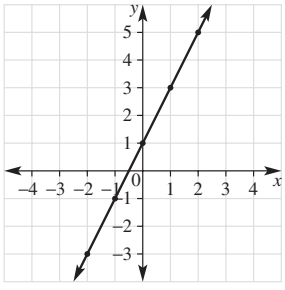
Chapter 8

Exercise 8A

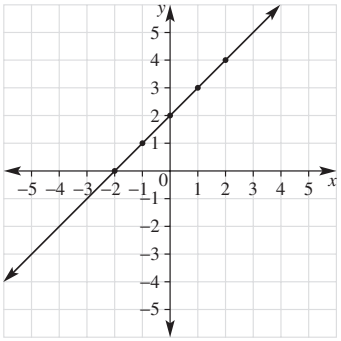
1a



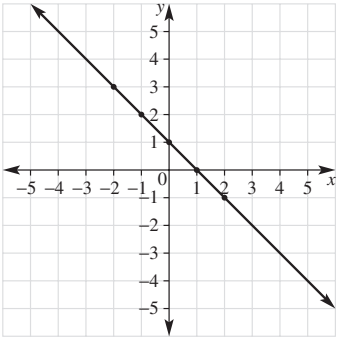
b



c



d



2a

x	−2	−1	0	1	2
y	−4	−2	0	2	4

b

x	−2	−1	0	1	2
y	4	2	0	−2	−4

c

x	−2	−1	0	1	2
y	−1	0	1	2	3

d

x	−2	−1	0	1	2
y	−3	−2	−1	0	1

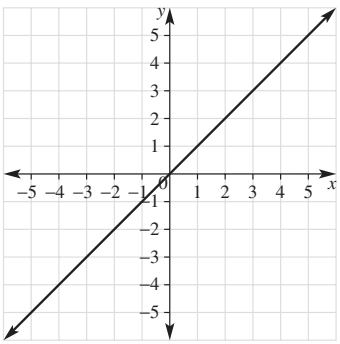
e

x	−2	−1	0	1	2
y	−1	1	3	5	7

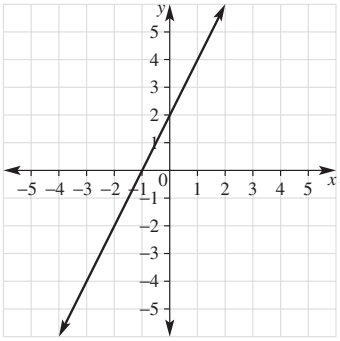
f

x	−2	−1	0	1	2
y	4	3	2	1	0

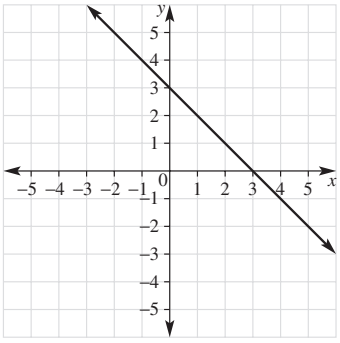
3a



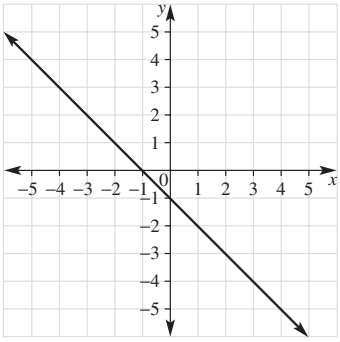
b



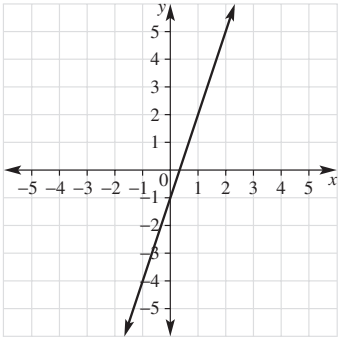
c



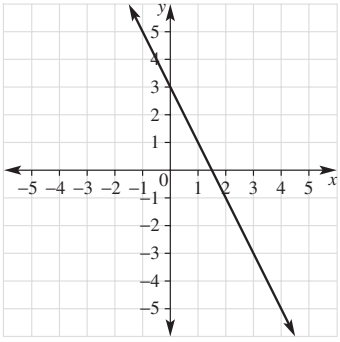
d



e



f



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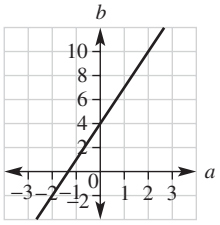
4a i

a	–2	–1	0	1	2
b	–2	1	4	7	10

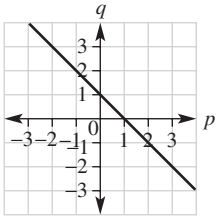
ii

p	–2	–1	0	1	2
q	3	2	1	0	–1

b

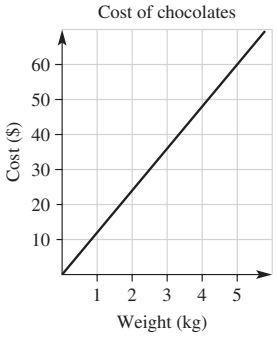


c



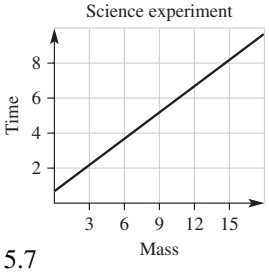
5a Cost (c) **b** Weight (w)

c



d $18

6a

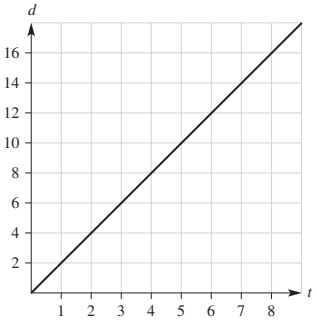


b 5.7

7a $d = 2t$

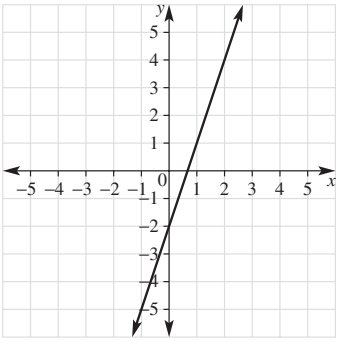
b

t	0	2	4	6	8
d	0	4	8	12	16

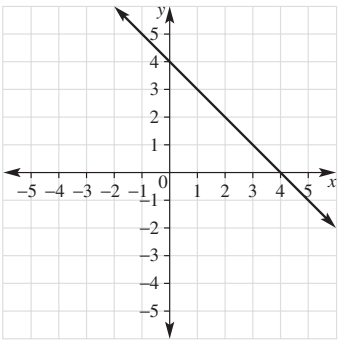


8a False **b** True **c** True
d True **e** False **f** False

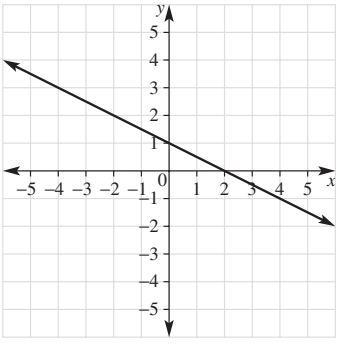
9a



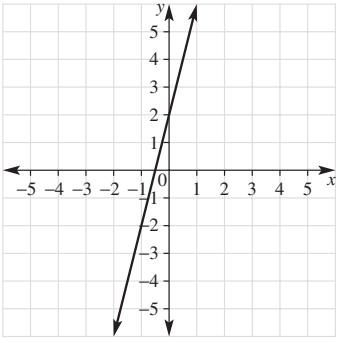
b



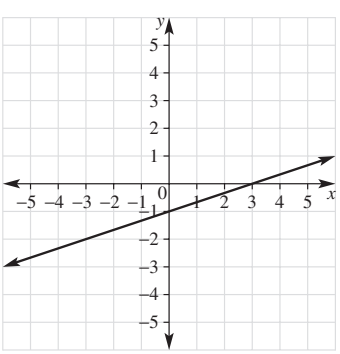
c



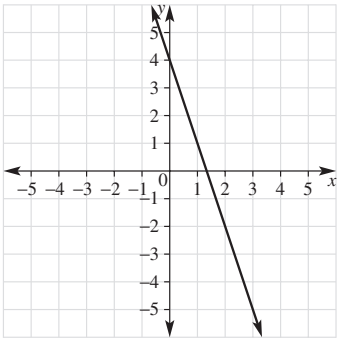
d



e



f



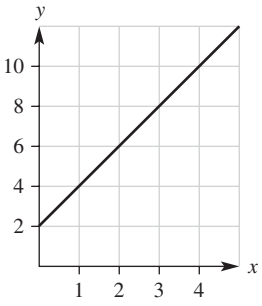
Exercise 8B

1a 4 **b** –1 **c** –12 **d** 4

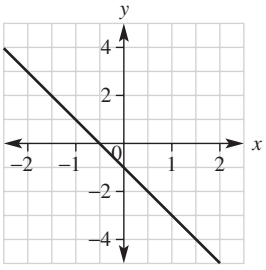
2a 2 **b** –5 **c** $-\frac{1}{2}$

3a 2 **b** –1

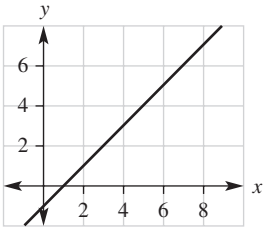
4a Gradient of 2, y-intercept of 2



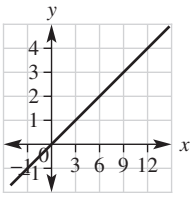
b Gradient of –2, y-intercept of –1



c Gradient of 1, y-intercept of –1

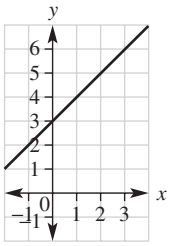


d Gradient of $\frac{1}{3}$, y-intercept of 0

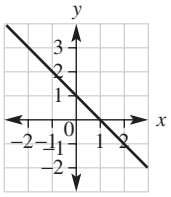


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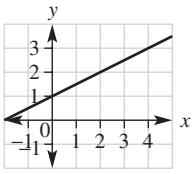
5a Gradient of 1, y-intercept of 3



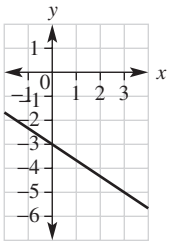
b Gradient of -1, y-intercept of 1



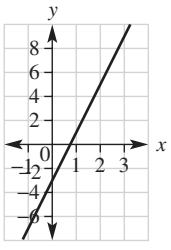
c Gradient of $\frac{1}{2}$, y-intercept of 1



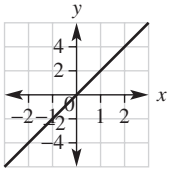
d Gradient of $-\frac{2}{3}$, y-intercept of -3



e Gradient of 4, y-intercept of -3



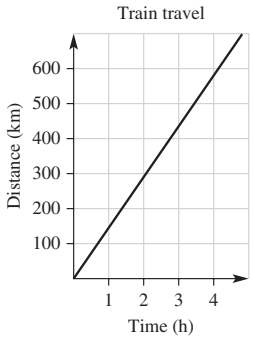
f Gradient of 2, y-intercept of 0



6a

t	0	1	2	3	4
d	0	150	300	450	600

b

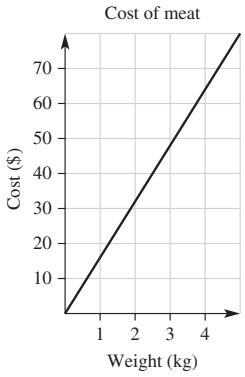


c 150 **d** 0

7a

n	0	1	2	3	4
c	0	16	32	48	64

b



c 16 **d** 0

Exercise 8C

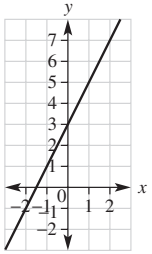
1a Gradient is 4, y-intercept is 2
b Gradient is 3, y-intercept is -7
c Gradient is 5, y-intercept is 0.4
d Gradient is 1.5, y-intercept is -2
e Gradient is $\frac{1}{2}$, y-intercept is 3
f Gradient is -3, y-intercept is 5
g Gradient is 1, y-intercept is 0
h Gradient is 5, y-intercept is 2

2a $y = 3x + 2$ **b** $y = -2x + 10$
c $y = -4x - 1$ **d** $y = 0.5x + 1$

3a $y = x + 1$ **b** $y = -2x - 1$
c $y = \frac{1}{2}x - 1$ **d** $y = -3x + 12$

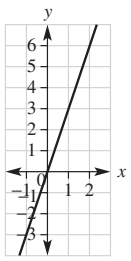
4a Gradient is 2, y-intercept is 3

b



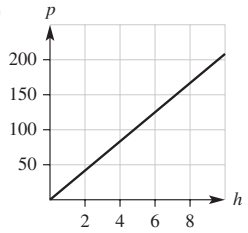
5a $y = 3x$

b



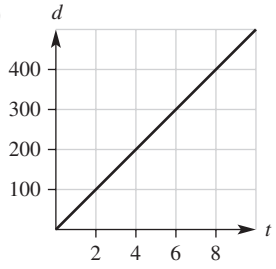
6a $p = 21h$

b

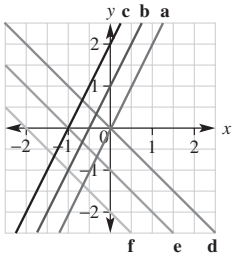


7a $d = 50t$

b

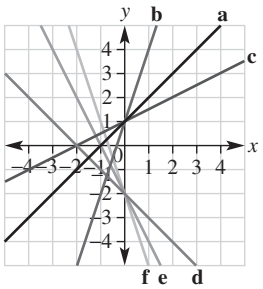


8a–f



g The graphs for equations a, b and c are parallel with a positive gradient. The graphs for equations d, e and f are parallel with a negative gradient.

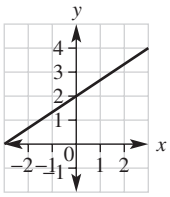
9a–f



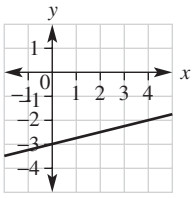
g The graphs for equations a, b and c intersect the y-axis at 1 (y-intercept of 1). The graphs for equations d, e and f intersect the y-axis at -2 (y-intercept of -2).

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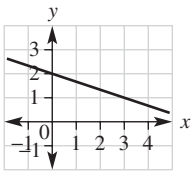
10a



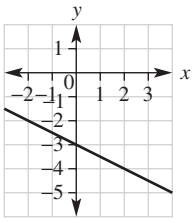
b



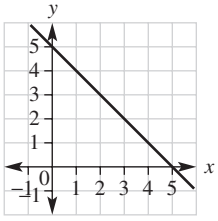
c



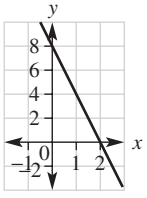
d



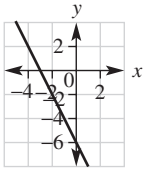
e



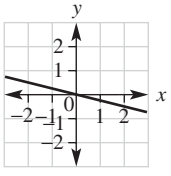
f



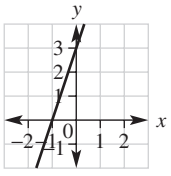
g



h



i



Exercise 8D

1a 500 L **b** 1500 L
c 2100 L **d** 10 minutes
e 1900 L

2a 400 CNY **b** 250 CNY
c 20 AUD **d** 70 AUD
e Gradient is 5

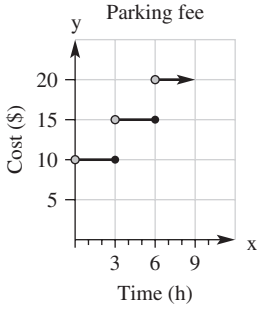
3a \$1.50 **b** \$3.50
c \$1.50 **d** \$3.00

4a \$40 000 **b** \$90 000
c 48 months **d** $v = -2.5t + 120$
e \$115 000 **f** \$2500

5a \$125 billion **b** 300 000
c $A = \frac{1}{4}N$ **d** \$87.5 billion
e \$250 billion

6a \$15 **b** \$25
c 30 calls **d** $C = 0.5n + 15$

7a



b \$15 **c** \$10 **d** \$15

8a



b 16 GBP **c** 25 AUD
d Gradient is 0.4, the vertical intercept is 0
e $GBP = 0.4 \times AUD$ or $y = 0.4x$

Exercise 8E

1a $y = 3x$ **b** $k = 3$
c 12 **d** 5

2a $y = 2x$ **b** $k = 2$
c 16 **d** 6

3a $y = \frac{1}{4}x$ **b** $k = 4$
c 6 **d** 16

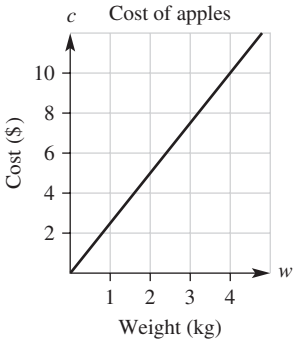
4a $a = 1.5b$ **b** $k = 1.5$
c 33 **d** 24

5a $p = 21.5h$ **b** $k = 21.5$
c \$236.50 **d** = \$139.75
e 17 hours **f** 35 hours

6a

w	0	1	2	3	4
c	0	2.5	5	7.5	10

b

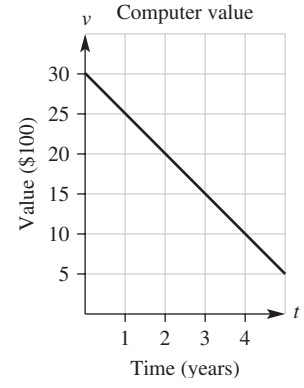


c 6

7a

t	0	1	2	3	4
v	30	25	20	15	10

b

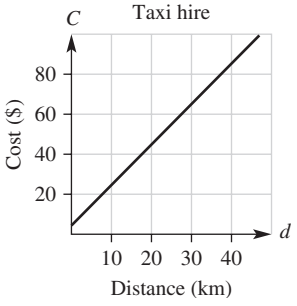


c \$3000 **d** \$2000 **e** 3 years

8a

d	0	10	20	30	40
C	3	23	43	63	83

b

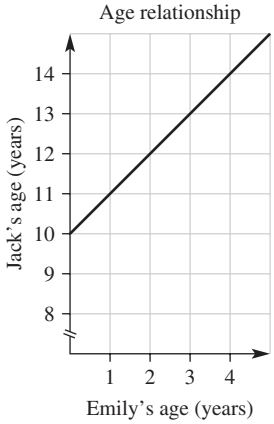


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9a

E	0	1	2	3	4
J	10	11	12	13	14

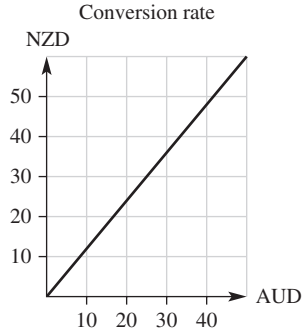
b



10a

AUD	0	10	20	30	40
NZD	0	12	24	36	48

b



Review 8

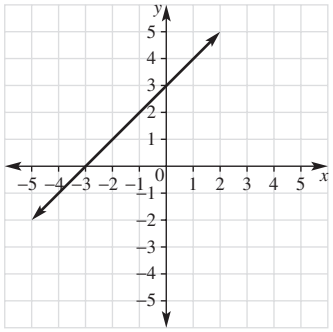
Multiple-choice

1 C **2** C **3** C **4** D
5 A **6** C **7** D **8** C

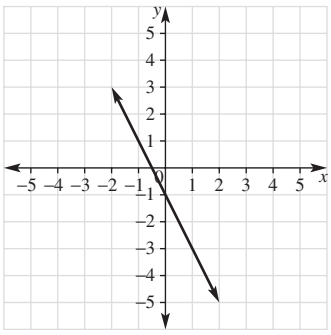
Short-answer

1a y values are 1, 2, 3, 4, 5
b y values are 3, 1, –1, –3, –5

2a



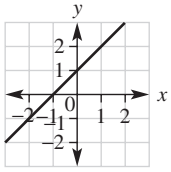
b



3a 1 **b** $\frac{3}{2}$ (or 1.5) **c** –2

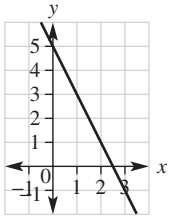
4a $y = 2x - 1$ **b** $y = -\frac{1}{2}x$

5a



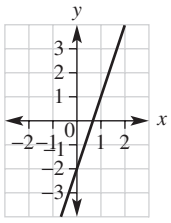
Gradient is 1 and y-intercept is 1.

b



Gradient is –2 and y-intercept is 5.

c

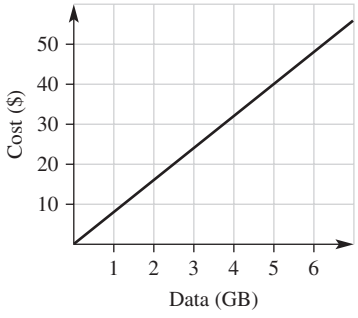


Gradient is 3 and y-intercept is –2.

6a π **b** 2 cm

7a Cost (c) **b** Data (d)

c

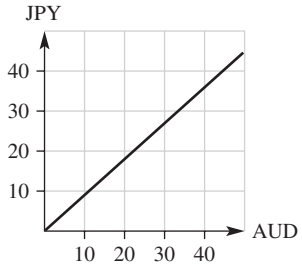


d 2.5

8a

AUD	0	10	20	30	40
JPY	0	9	18	27	36

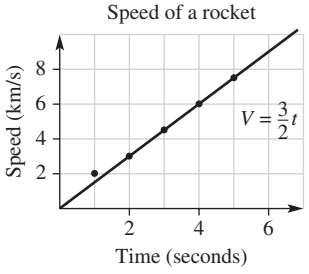
b



Extended-response

9a $18 000
b $24 000
c $v = -0.5t + 30$
d $27 000
e 60 months
f $500

10a



b 9 km/s
c 8 seconds

Chapter 9

Exercise 9A

1a $11 000 **b** $165 000
c $567 000 **d** $777
e $18 500
2a $944 **b** $11 440
c $18 912.50 **d** $6135
e $50 850
3a $33 150 **b** $203 150
4 $97.88
5 $1.67
6 Computer application
7a 24 **b** $450 **c** $93.75
8a $22 000 **b** 10.5% p.a.
c $9240 **d** $650.83

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9a \$14 000 **b** \$3640 **c** \$735
10a \$68 000 **b** \$2000
11 8.98% p.a.
12a \$7200
b \$50 256
c \$14 256
d 16.5% p.a.
13 24% p.a.
14a \$40 650
b 7.1% p.a.
c \$903.33

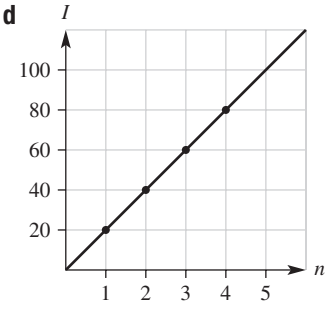
Exercise 9B

1a $I = 20n$

b

n	0	1	2	3	4
I	0	20	40	60	80

c, d

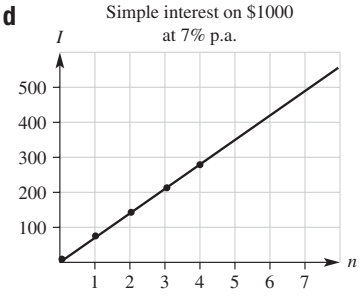


2a $I = 70n$

b

n	0	1	2	3	4
I	0	70	140	210	280

c, d



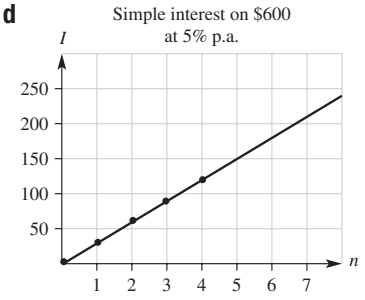
e \$175 **f** \$420 **g** 3 years

3a $I = 30n$

b

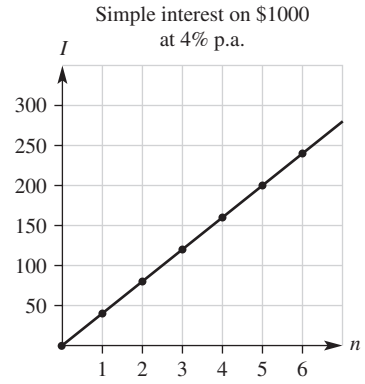
n	0	1	2	3	4	5
I	0	30	60	90	120	150

c, d



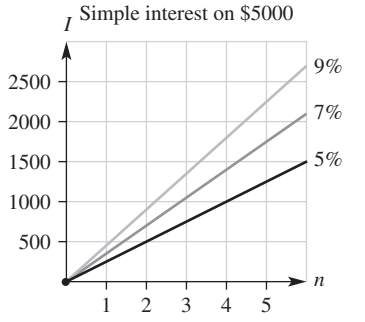
e \$105 **f** \$180
g 12 years

4



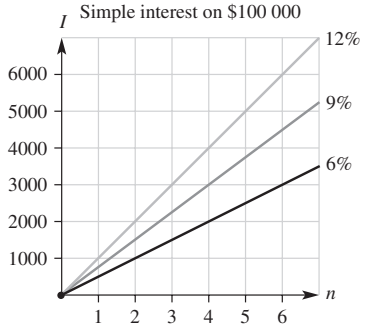
\$240

5a



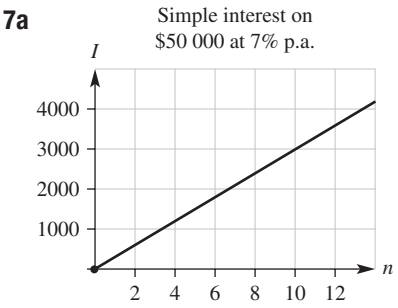
b i \$625 **ii** \$875
iii \$1125
c i \$1250 **ii** \$1750
iii \$2250
d i 4 years
ii About 2.8 years
iii About 2.2 years

6a

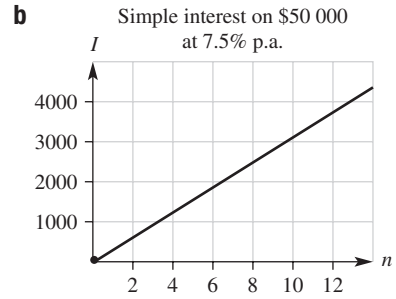


b i \$500 **ii** \$750
iii \$1000
c i \$3000 **ii** \$4500
iii \$6000
d i 4 months
ii about 2.7 months
iii 2 months

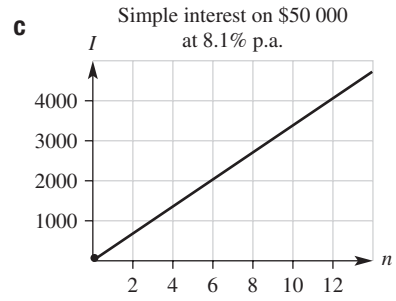
7a



b



c



Exercise 9C

1a \$4.80 **b** \$36 **c** \$9.90
d \$22 **e** \$536 **f** \$70.56
g \$6.75 **h** \$0.12
2a \$22 **b** \$156 **c** \$112
d \$822 **e** \$3 **f** \$11.52
g \$80 **h** \$0.70
3a \$24 **b** \$19.80 **c** \$135
d \$6.60 **e** \$37.2 **f** \$15
4a \$49 014.40 **b** \$100 551.60
c \$131 736.80 **d** \$68 878.80
5a \$185.25 **b** \$234
c \$546 **d** \$68.25

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6a $15 810 **b** $13 438.50
7a $96 **b** $323.40
c $20 **d** $1263.50
e $993.60 **f** $84
8 25%
9a $501.60 **b** $336
c $510 **d** $249.60
10a 10% **b** $198

Exercise 9D

1a $3.60 **b** $14.00 **c** $17.00
d $0.32 **e** $49.00 **f** $4.20
g $4.29 **h** $260 **i** $37.00
2a $62 **b** $682
3a $78 **b** $858
4a £26.25 **b** £14
c £3.50 **d** £1.40
5a 8820 **b** 2940 **c** 7140
d 5250 **e** 7560 **f** 2100
g 5880 **h** 2730
6a $16 **b** $22 **c** $90
d $35 **e** $14 **f** $180
7a $540 **b** $347
8 Computer application
9 $329.09 **10** $1681.82

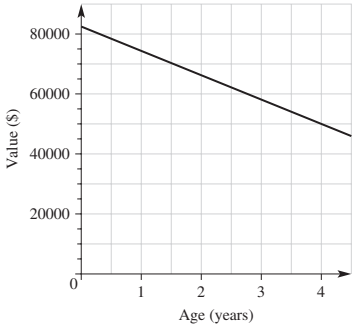
Exercise 9E

1a $3040 **b** $12 160
c $3040 **d** $9120
e $3040 **f** $6080
2a $6950 **b** $5250
c $3550 **d** $1850
3 $33 300
4a $16 000 **b** $4000
c $4000 **d** After 2 years
e $2000 **f** $14 000
5 $49 950
6 $21 400
7a 9 years **b** 14 years
8a After 8 years **b** After 9 years
9a $6400 **b** $19 200
10 $2400
11 $3000
12a $8000
b $32 000

c

Year	Current value	Depre-ciation	Depre-ciated value
1	$82 000	$8000	$74 000
2	$74 000	$8000	$66 000
3	$66 000	$8000	$58 000
4	$58 000	$8000	$50 000

d



Review 9

Multiple-choice

1 B **2** B **3** C **4** B **5** D
6 D **7** D **8** D **9** C **10** A

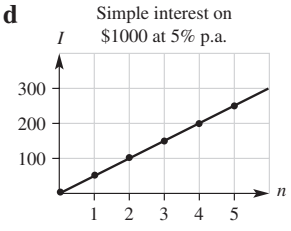
Short-answer

1 $96 000 **2** $2600 **3** $18
4 7% p.a.
5 2 years 3 months
6 16.7% **7** $4.68
8a $I = 50n$

b

n	0	1	2	3	4	5
I	0	50	100	150	200	250

c, d



e $275
9a $7.22 **b** $4.66
c $13.49 **d** 7.98
10 $110.16
11a $28.60 **b** $314.60
12a $2322 **b** $1376

Extended-response

13 $139.22
14a $280 **b** 31.4%
15a $12 000 **b** $48 191.55
c $36 191.55

Chapter 10

Exercise 10A

1a

Class	Class centre	f	$f \times x$
25–29	27	25	675
30–34	32	21	672
35–39	37	35	1295
40–44	42	21	882
45–49	47	26	1222
50–54	52	23	1196
55–59	57	32	1824
		183	7766

b 183 people **c** 42
2 64.9
3a

Class	Class centre	f	$f \times x$
2000–2004	2002	9	18 018
2005–2009	2007	15	30 105
2010–2014	2012	18	36 216
2015–2019	2017	10	20 170
2020–2024	2022	8	16 176
2025–2029	2027	6	12 162
2030–2034	2032	3	6 096
2035–2039	2037	1	2 037
		70	140 980

b 70 vehicles
c 2014

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4a 41 **b** 48
c Median
5a Mean = 17, median = 16, mode = 16
b All measures increased by 5.
c Mean = 22, median = 21, mode = 21
6 14
7a 7.6
b 12
8a 20 **b** 19.5
c

Age	Frequency	Cum. freq.
18	2	2
19	5	7
20	6	13
21	2	15

d 19
9a 10 **b** 7
c

Drinks	Frequency
7	5
8	7
9	4
10	2

d 8 **e** No
10 64.4 km
11a 0 **b** 50 **c** 250 **d** 25
12a–c

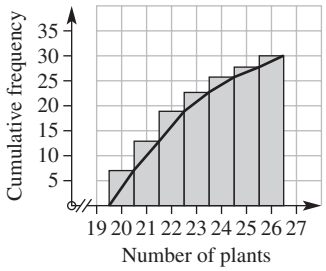
Class	x	f	$f \times x$
65–69	67	4	268
70–74	72	6	432
75–79	77	7	539
80–84	82	11	902
85–89	87	6	522
90–94	92	6	552
		40	3215

d 40 pieces of data
e 80.4
f 79.9

13a

Plants	Frequency	Cum. freq.
20	7	7
21	6	13
22	6	19
23	4	23
24	3	26
25	2	28
26	2	30

b



c Median is about 22

Exercise 10B

1a 28 **b** 11 **c** 16
d 21 **e** 32 **f** 10
2a 5 **b** 8 **c** 5 **d** 8
3a 10 **b** 6.5 **c** 10.5 **d** 4
4a 11 **b** 10 **c** 5
d 27 **e** 21 **f** 9
5a 110 **b** 122
c 185 **d** 63
6a 2.4 **b** 49.9 **c** 0 **d** 10.2
7a 3.6 **b** 3.8 **c** 3.4 **d** 44.9
8a 3.92 **b** 7.10
9a 2.3 **b** 1.7 **c** 2.0
10a 18.4 **b** 18.7
11a 120 **b** 41.48 **c** 70
12 Mean will be increased and the sample standard deviation will decrease.
13a Molly: $\overline{x} = 12.1$ and $\sigma_x = 4.7$
b Harry: $\overline{x} = 14.0$ and $\sigma_x = 3.0$
c Harry's results were more consistent as he has a lower standard deviation.
14a Charlie is more consistent as he has a lower interquartile range.
b Thomas is most likely to make the higher score as his median is 2 less than Charlie's but he has an interquartile range that is 5 higher.
15 Data test is the better result as Amber's result is more than one standard deviation above the class mean. Algebra test is less than one standard deviation above the mean.
16a 16.08 **b** 1.4
c Standard deviation measures the spread of data about the mean.

Exercise 10C

1a 34 **b** 48 **c** 16
d 133 **e** 53 **f** 0
2a 31 **b** 56
c 42 **d** 48
e 6 **f** Outlier 31
3a Yes, 1 **b** Yes, 69 **c** Yes, 20
d No **e** No **f** Yes, 0
4a No **b** Yes, 36 **c** No
d No **e** No **f** Yes, 59
5a 27 **b** 37 **c** 10 **d** 76
6 96 is not an outlier.
Upper limit $= Q_3 + 1.5 \times \text{IQR}$
$= 69 + 1.5 \times 20$
$= 99$
7 31 is an outlier
Upper limit $= Q_3 + 1.5 \times \text{IQR}$
$= 21 + 1.5 \times 5.5$
$= 29.25$
8a 16 **b** 5 **c** 20
d The outlier is the highest score and directly affects the range. It has a smaller effect on the interquartile range.
9a Mean = 20, median 13
b Mean is drastically reduced from 20 to 12.375.
Median is unaltered at 13.

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10a i Mean = 28.9, median = 26, mode = 26

ii Mean = 41.3, median = 34, mode = 27 & 34

iii Mean = 83.3, median = 88, mode = 88

iv Mean = 61.3, median = 65, mode = 62

b i Mean = 24.2, median = 24.5, mode = 26

ii Mean = 32, median = 31.5, mode = 27 & 34

iii Mean = 90.2, median = 89.5, mode = 88

iv Mean = 66.4, median = 66.5, mode = 62

11a Mean = 21.4, median = 18

b Mean = 17.1, median = 18
Removing the outlier has affected the mean.

12a Yes. Outlier is \$990
Upper limit = $Q_3 + 1.5 \times IQR$
$= 670 + 1.5 \times 170$
= \$925

b The dataset is translated by 50 in the positive direction but the standard deviation remains the same.

13a 1.3 **b** 1 **c** 0

d Mean = 1.1, median = 1, mode = 0

Exercise 10D

1a Not smooth, not symmetrical, unimodal

b Smooth, not symmetrical, unimodal

c Smooth, symmetrical, multimodal

d Smooth, symmetrical, unimodal

e Smooth, not symmetrical, unimodal

f Not smooth, not symmetrical, unimodal

g Smooth, not symmetrical, unimodal

h Smooth, not symmetrical, bimodal

2a Positively skewed

b No skew

c Negatively skewed

d No skew

e Negatively skewed

f Positively skewed

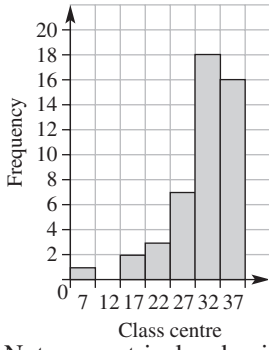
g Negatively skewed

h No skew

3a Mean = 31.1, median = 32, modal class = 30–34

b Mean has increased to 31.7 and the median has stayed at 32.

c



d Not symmetrical and unimodal

e Negatively skewed

4a Mean = 84.1, median = 94.5, mode = 95

b True but misleading. Lily's result is above the mean but below the median and mode. The mean has been affected by the outlier (11) as measure of the centre.

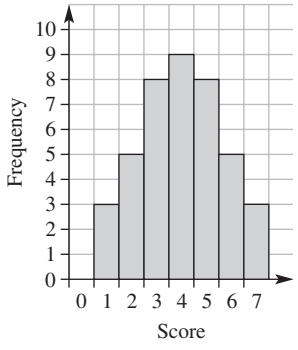
5a i 4 **ii** 4

iii 4 **iv** 1.7

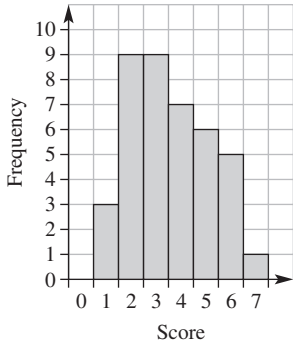
b i 3 **ii** 3.6

iii 2 and 3 **iv** 1.6

c



d



e Sample A is symmetrical and unimodal. Sample B is not symmetrical and bimodal

f Sample A is not skewed. Sample B is positively skewed.

Exercise 10E

1a 18

b Mean = 8.7, median = 9

c Mean = 9.2, median = 9

d Range = 2, IQR = 2

e Range = 3, IQR = 1

f 1.1

g 0.9

h Class B. Measures of the location are higher and measures of spread are smaller (ignore outlier).

i Both classes have performed well, with the measures of location close to 9 out of a possible 10. Class B is more consistent, with only one student scoring less than 8.

2a Mean = 22.6, median = 24

b Mean = 23.4, median = 25

c Range = 28.0, IQR = 14.0

d Range = 26.0, IQR = 14.0

e 7.8

f 7.9

g The two sets of data have similar measures for location and measures for spread. Number of females retiring is slightly higher on average than the number of males (compare mean and median).

3 Computer application

4a Sydney:
Mean = 7.7, median = 7.4
Melbourne:
Mean = 8.7, median = 6

b Median is the better measure. Mean in Melbourne has been distorted by an outlier (25.2).

c Sydney:
Range = 5.9, IQR = 2.25
Melbourne:
Range = 23.2, IQR = 8.7

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d Interquartile range is the better measure. Range in Melbourne has been distorted by an outlier (25.2).

e Area of the Sydney suburbs is more than the area of the Melbourne suburbs. There is a greater spread in the area of the suburbs in Melbourne compared to the area of the suburbs in Sydney.

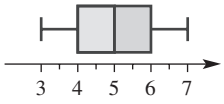
Exercise 10F

1a 20 **b** 100 **c** 60
d 35 **e** 90

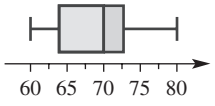
2a Min = 44, Q_1 = 48.5, med = 53.5, Q_3 = 58, max = 61

b Min = 8, Q_1 = 12, med = 20.5, Q_3 = 30, max = 42

3a

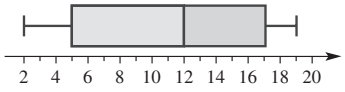


b



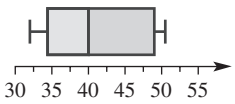
4a i 2 **ii** 19 **iii** 17
iv 5 **v** 17 **vi** 12

b



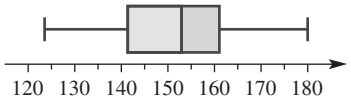
5a i 32 **ii** 51 **iii** 19
iv 34.5 **v** 48 **vi** 40

b



6a 123 **b** 180 **c** 154
d 141.5 **e** 161.5

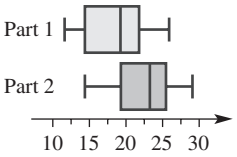
f



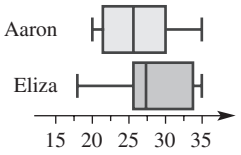
g Data is not skewed, has a median of 154 and an interquartile range of 20.

7a 25 **b** 13 **c** 21 **d** 16
e 14 **f** 22.5 **g** 5.5 **h** 10.5

8



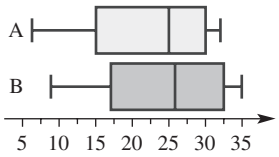
9



10a Min = 6, Q_1 = 15, med = 25, Q_3 = 30, max = 32

b Min = 9, Q_1 = 17, med = 26, Q_3 = 32, max = 35

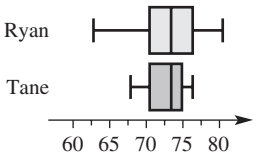
c



d 15 **e** 15

11a 63 **b** 74 **c** 77
d 74 **e** 71 **f** 77

g

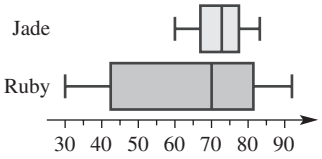


h Ryan: Range = 18, IQR = 6
Tane: Range = 9, IQR = 4.5

i Tane is the better student even though they have the same median. Tane's results are more consistent (less spread).

12a 30 **b** 94 **c** 73.5
d 67 **e** 77.5

f



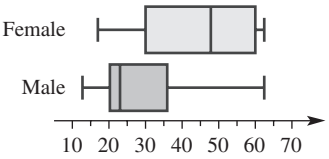
g Ruby's data has a greater upper extreme and a smaller lower extreme than Jade's data. This results in a larger range and interquartile range. Jade's data has a higher median than Ruby's.

h Jade is the more popular politician. Her data has a larger measure of centre (median) and the spread is smaller (interquartile range).

13a Min = 18, Q_1 = 30, med = 47.5, Q_3 = 61, max = 63

b Min = 12, Q_1 = 20, med = 23.5, Q_3 = 37, max = 63

c



d Female: Range = 45, IQR = 31
Male: Range = 51, IQR = 17

e Female data has a greater lower extreme but has the same upper extreme as the male data. In addition, the female data has a larger interquartile range but a smaller range. Female data has a higher median than the male data.

f Age of the females is higher than the age of the males attending the conference. There is a larger spread in the ages of the females attending the conference.

Review 10

Multiple-choice

1 C **2** D **3** C **4** B
5 A **6** B **7** A

Short-answer

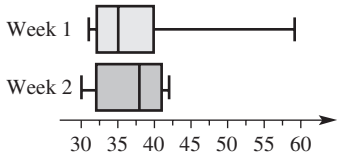
1a 15 **b** 4 **c** 8

2a

Score (x)	f	$f \times x$
41	3	123
42	5	210
43	9	387
44	9	396
45	8	360
46	8	368
47	5	235
48	4	192
Total	51	2271

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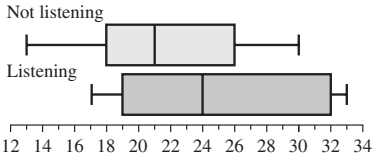
b 51
c See part a
d 44.5
3 68%
4a 4 **b** 5.5 **c** 5
d 27 **e** 21 **f** 9
5a 10 **b** 5.5 **c** 9.5 **d** 4
6a Brand A: Mean = 75 hours, $S_x = 13.8$ hours
Brand B: Mean = 76 hours, $S_x = 25.0$ hours
b Brand A has a more consistent lifetime as the standard deviation is smaller than for Brand B.
7a



b 35 **c** 38 **d** 8 **e** 9
f Week 1 is positively skewed.
8a 19 **b** 15 **c** 5
d Positively skewed
e Negatively skewed
f Upper limit = $Q_3 + 1.5 \times \text{IQR}$
$= 13 + 1.5 \times 10 = 28$
As 20 < 28, 20 is not an outlier.

Extended-response

9a



b The statement is not reasonable. The 'not listening' group not only has a lower minimum and maximum than the 'listening' group, every other summary statistic is lower as well. Although the range of the 'not listening' group is slightly higher, its smaller interquartile range indicates that the scores are more consistent. Significantly, the maximum score of the 'not listening' group is significantly lower that the upper quartile of the 'listening' group.

Chapter 11

Exercise 11A

1a 150 min **b** 120 s **c** 480 h
d 2400 s **e** 108 h **f** 600 min
g 12 h **h** 800 min **i** 4 d
j 45 d **k** 6.5 h **l** 13 min
2a Minute **b** Minute
c Year **d** Week
e Second **f** Hour
3a 3600 s **b** 86400 s
c 31536000 s
4a 9:30 p.m. **b** 6:00 a.m.
c 7:00 p.m. **d** 5:00 p.m.
e 4:30 p.m. **f** 1:45 a.m.
5a 6:09 a.m. **b** 10:09 a.m.
c 9:29 p.m. **d** 11:43 a.m.
e 6:53 p.m. **f** 1:09 a.m.
g 5:05 p.m. **h** 12:00 noon
6a 4 h 38 min **b** 5 h 50 min
c 9 h **d** 13 h 31 min
e 18 h 24 min **f** 13 h 8 min
7a 8 h 25 min **b** 3 h 12 min
c 1 h 12 min **d** 3 h 50 min
e 3 h 16 min **f** 2 h 50 min
8a 3 h **b** 7 h 10 min
c 1 h 3 min **d** 1 h 30 min
e 10 h 30 min **f** 11 h 2 min
9a 3:00 p.m.
b 12:00 a.m. (midnight)
c 8:00 a.m. **d** 1:10 p.m.
e 5:56 p.m. **f** 7:13 p.m.
10a 8 h 32 min **b** 1 h 25 min 20 s
c 1h 28 min
11a 02:00 **b** 22:30 **c** 20:41
d 23:12 **e** 01:59 **f** 00:00
g 21:09 **h** 16:39 **i** 05:15
12a 3:18 a.m. **b** 10:40 a.m.
c Midday or 12:00 noon
d 5:56 p.m. **e** 9:11 a.m.
f 11:00 p.m. **g** 6:45 p.m.
h 3:20 a.m. **i** 8:50 p.m.
13a 12:29 **b** 18:48 **c** 04:10
14a 09:25 **b** 08:36 **c** 20:10
15 4 h 20 min **16** 1 h 47 min
17 19:14
18

	Program (12-h)	Time settings (24-h)
a	6:00 a.m. to 7:38 a.m.	06:00 to 07:38
b	10:25 a.m. to 12:35 p.m.	10:25 to 12:35
c	3:20 p.m. to 4:54 p.m.	15:20 to 16:54
d	6:30 p.m. to 8:05 p.m.	18:30 to 20:05
e	7:50 a.m. to 10:00 a.m.	07:50 to 10:00
f	12:45 p.m. to 2:10 p.m.	12:45 to 14:10
g	0:20 a.m. to 3:49 p.m.	00:20 to 15:49
h	11:10 p.m. to 2:07 a.m.	23:10 to 02:07

19a 3 h 32 min **b** 15:34
c 18:07 **d** 07:38
20a 4:32 p.m. **b** 2 h 55 min
c 1 h 40 min **d** 3 h 40 min
21a 17 h **b** 32%

Exercise 11B

1a i 23:11 **ii** 23:19
iii 23:22
b i 6 min **ii** 8 min
iii 13 min
c 24 min **d** 15 min **e** 8
f 22:45 **g** 23:03
2a Sydney, Circular Quay, Wharf 4
b Mosman, Taronga Zoo Wharf
c 11:12 **d** 12 min
3a 04:18 **b** 5 **c** 05:40
d 06:32 **e** 51 min
4a 40 min **b** 44 min **c** 8:15
d 17:52 **e** 17 min
5a 3:10 p.m.
b Departs from Sydney and arrives at Phuket.
c 5 h 10 min

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6a 5:35 p.m.
b Departs from Sydney and arrives at Singapore.
c 5 h 20 min
7a Departs from Tokyo and arrives at Singapore.
b 6 h 40 min **c** 6 h 40 min
d 6 h 5 min
e Departs Tokyo and arrives at Sydney.
f 11 h 35 min
8a Departs from Sydney and arrives at London.
b 7 h 55 min **c** 5 h 10 min
d 1 h **e** 13 h 5 min
9a 11 **b** 5 h 35 min
c 23:28 **d** 3 h 55 min
e 3 h **f** 09:43
10 Investigation

Exercise 11C

1a (60°N, 0°) **b** (0°, 70°E)
c North Pole 90°N and South Pole 90°S
2a Lima **b** 62° **c** 81°
3a Teheran **b** 76° **c** 123°
4a (15°N, 136°E) **b** (55°N, 136°E)
c (35°N, 116°E) **d** (35°N, 156°E)
5a (4°N, 20°E) **b** (84°N, 20°E)
c (44°N, 20°W) **d** (44°N, 60°E)
6a Latitude of 48°N **b** 11°E
a Munich **b** (48°N, 82°E)
7a **i** Kuala Lumpur
ii Rio de Janeiro
iii Kuala Lumpur
iv Sofia
b **i** Adelaide
ii Montevideo
iii Birmingham
iv Athens
c Athens, Birmingham, Cairo, Sofia, Warsaw and Kuala Lumpur
d Birmingham, Montevideo and Rio de Janeiro
e Adelaide and Montevideo; Birmingham and Warsaw
f Athens and Sofia
g Birmingham and Warsaw
h Adelaide and Montevideo
8a Hobart and Port Moresby are located on the 147°E meridian of longitude. Hobart (42°S) is further south than Port Moresby (9°S).
b (25.5°S, 147°E)
9a 23° **b** 182° or 178°
c (3°S, 76°W) **d** (6°S, 174°W)

Exercise 11D

1

WST (+8)	CST (+9.5)	EST (+10)
1:00 p.m.	2:30 p.m.	3:00 p.m.
5:00 a.m.	6:30 a.m.	7:00 a.m.
6:20 p.m.	7:50 p.m.	8:20 p.m.
4:19 a.m.	5:49 a.m.	6:19 a.m.
10:30 p.m.	Midnight	12:30 a.m.
7:12 a.m.	8:42 a.m.	9:12 a.m.

2a 4:30 p.m. **b** 6:00 p.m.
c 6:00 p.m. **d** 6:30 p.m.
3a 8:10 a.m. **b** 10:10 a.m.
c 9:40 a.m. **d** 10:10 a.m.
4a 4:00 p.m. **b** 8:00 a.m.
c 10:00 p.m. **d** 10:00 a.m.
5a 4:00 a.m. Sunday
b 4:00 p.m. Saturday
c 11:00 a.m. Sunday
d 12:00 Midnight
6a 6 h **b** 4 h **c** 12 h
d 8 h **e** 9 h **f** 5 h
g 11 h **h** 12 h
7a 10:00 a.m. **b** 3:00 a.m.
c 7:00 a.m. **d** 11:00 p.m.
8a 8:00 p.m. Monday
b 8:00 a.m. Tuesday
c 11:00 p.m. Monday
d 3:30 p.m. Tuesday
9a 4:00 p.m. **b** 2:00 p.m.
c 3:30 p.m. **d** 4:30 p.m.
10 4:00 p.m. Sunday 31 October
11 7:00 a.m. Friday
12a 18 h **b** 19 h
13 6 h
14a 6:30 p.m. **b** 7:30 a.m.
15a 11:45 p.m.
b 12:00 (midnight)

Exercise 11E

1a 9 h
b 12:00 a.m. (midnight)
2a 1:00 p.m. on Friday 30 March
b 7:00 a.m. on Saturday 31 March
3a 18 h
b 6:00 p.m. Sunday
4 7:00 a.m. Sunday
5 8:00 p.m. 25 November
6 7:00 p.m. 25 December
7 10:00 p.m. Sunday
8 6:00 a.m. Friday
9 12:45 p.m.
10a 5:15 a.m. **b** 2:40 p.m.
c 4:30 p.m.
11a 6:00 a.m. on 5 June
b 1:00 p.m. on 5 June
12a 4 p.m. Monday 11 October
b 4 a.m. 27 October
13a 4:00 a.m. Tuesday 17 May
b 4:00 a.m. Saturday 21 May

Review 11

Multiple-choice

1 C **2** B **3** D **4** D
5 A **6** A **7** C **8** A

Short-answer

1a 7200 s **b** 84 h **c** 420 min
d 10.5 h **e** 400 min **f** 5 days
g 43 days **h** 12.5 h **i** 16 min
2a 15:10 **b** 20:35 **c** 06:00
3a 7 h **b** 6 h 10 min **c** 50 min
4 10:26 am
5a 10:51 am **b** 11:11 am
6a 0 h 13 min **b** 0 h 15 min
c 29 min
7a Salvador **b** 38°
c 106°
8a 63° **b** 274° or 86°
c 24°S, 100°W **d** 37°S, 124°E
9 1:00 a.m.

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10a 30 min **b** 8:30 a.m.
11a 2 h **b** 3:00 p.m.
12a 7:00 a.m. **b** 12:00 noon

Extended-response

13a 6:00 p.m. Saturday
b 11:00 p.m. Saturday
14 4.5 h
15 6:30 a.m. Saturday 9 July

Chapter 12

Exercise 12A

1a 21 Sep **b** 7034 8751 3763
c $349.22 **d** 10 Oct
e $31.74 **f** $281.11
g $316.68 **h** $32.54
i 10.28%
2a 77.69 MJ **b** 248.92 MJ
c $2.50 **d** 68.79%
e Greenhouse gas emissions have decreased from 1.4 tonnes to 0.5 tonnes.
3a 4 **b** kWh
c 9 kWh **d** July
4a $80.14 **b** $189.04
c $309.18
5 $2288
6a 12 kW **b** $1.78
7a $15.54 **b** $125.87
c $202.80 **d** $459.20
8a $30.44 **b** 33.33%

Exercise 12B

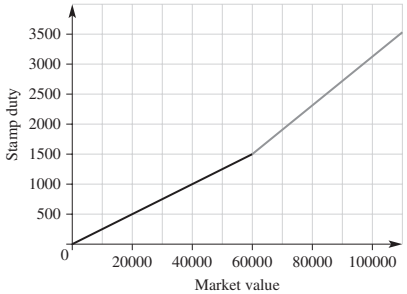
1a 16% **b** 25%
c 10% **d** 12.3%
2a $29 500 **b** $13 870
c $14 660 **d** $53 050
3a $5350 **b** $2886
c $15 785 **d** $26 080
4a $24 600 **b** $26 880
c $56 160 **d** $126 880
5a $12 280 **b** $18 000
c $30 280
6a $76 800 **b** $84 300
c $42 300
7a $6400 **b** 160 weeks
8a $2700 **b** $30 240
c $32 940 **d** $5940
9a $87 000 **b** $110 880
c $23 880
10a $26 000 **b** $71 240
c $23 400
11a $239 **b** $404
c $321 **d** $101
12 $9026
13 Investigation

Exercise 12C

1a $432 **b** $1183 **c** $528
d $396 **e** $1175
2a 40%
b 40 and 60 age groups
c 10%
d Charge a higher excess.
3a $474.60 **b** $1200
4 $1225.75
5a $602 400 000 **b** $99 600 000
c $260 400 000 **d** $237 600 000
6a Penrith **b** Yes
c $770 **d** $540
e Brand A **f** $994.75
g $685.00 **h** $658.33
i $879 **j** $556.20

Exercise 12D

1a $978 **b** $795 **c** $1350
d $414 **e** $1068 **f** $717
g $1735 **h** $4025 **i** $5105
2a $330 **b** $745 **c** $1140
d $1983 **e** $1563 **f** $2508
g $1435 **h** $2172 **i** $2606
3a $355 **b** $1160
c $1071 **d** $861
4a $600 **b** $2100
c $1350 **d** $2600
e $10 000 **f** $64 000
5



a $750 **b** $1500
c $2300 **d** $20 000
e $40 000 **f** $97 500

Exercise 12E

1a 3 **b** 15 L
c $180 **d** $0.012
2a $10 250 **b** $15 525 **c** $21 700
3a 9.55 **b** 8.82 **c** 5.06
d 8.21 **e** 9.32 **f** 3.5
4a 271.6 L **b** 73.2 L **c** 65.8 L
d 30.9 L **e** 98.2 L **f** 342.9 L
g 404.9 L
5a 444 km **b** 37.2 L **c** $50.23
6 480 km
7 Once. Distance required is 772 km. Distance travelled on one tank of petrol is 625 km.
8a 35 L **b** 55 L **c** 45 L
d 50 L **e** 70 km/h **f** 5 L
9a $1320 **b** $1280
c $2600 **d** $3104
10a $102.75 **b** $105.74 **c** $2.99
11a 33.6 L **b** 46.2 L
c Tyler 1747.2 L, Oscar 2402.4 L
d $2446.08 **e** $1897.90
f 3 **g** Investigation
12 Investigation

Exercise 12F

1a $1536 **b** $2550
c $18 720 **d** $23 400
2 $13 473.00
3a $61 460.37 **b** $59 769.77
c $1690.60
4a $1200 **b** $500
c 17.6% **d** 20 weeks
5 Computer application
6a $1500 **b** $2520
c $1020 **d** $1000
7a $51400 **b** $329
8a $23 350
b Yes. Extra amount is $16 800 after subtracting rent.
9a $9050 **b** $1020
c $3680
d Hayley requires another $560 for her trip.

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10a

Income		Expenses	
Job	$74	Sport	$24
Allow	$30	Movies	$22
		School	$16
		Food	$20
		Balance	$22
	$104		$104

b $22

11a $526 **b** $658 total

c $77 total

d

Income		Expenses	
Job	$1896	Mortgage	$526
		Groceries	$360
		Entertain	$120
		Medical	$18
		Car	$160
		Electricity	$20
		Telephone	$14
		Rates	$43
		Balance	$635
	$1896		$1896

Review 12

Multiple-choice

1 C **2** D **3** D **4** A
5 A **6** C **7** A **8** B

Short-answer

1 $27 103.50
2 16.7%
3a $61 800 **b** $22 800
4a $765 **b** $1000
5 $832
6a 17.453 L **b** $27.92
c 33.104 L **d** $44.69
7a 525 km **b** 8 L/100 km
c 7.6 L/100 km
8a $63 315.25 **b** $61 562.83
c $1752.42
9 $1526

Extended-response

10a $40 800 **b** $24 480 **c** $17 360

Practice Paper 2

1 C **2** B **3** A **4** D **5** A
6 C **7** C **8** C **9** A **10** D
11 C **12** D **13** D **14** A **15** C
16a i $367.20 **ii** $112.80
iii 23.5%
b i 48°
ii 260° or 100°
iii (15°S, 82°W)
c $924
d i 17.1125 L **ii** $23.44
e $7142.86
f $1940
g $c = 0.40x + 100$
17a i –3 **ii** 2
iii $y = -3x + 2$ **iv** $\frac{2}{3}$
b 68%
c The sample has not been picked at random. The five students selected are not in school uniform and may not be representative of the school. It is possible that these students do not like the school uniform.
d i 8.7 **ii** 9 **iii** 10
iv 3 **v** 2
e 4.5%
18a i 45 kg **ii** 76 kg
iii 19 kg **iv** 300
b i Qualitative categorical data
ii Quantitative discrete data
iii Quantitative continuous data
c 23.8% **d** $4000
e i 7:30 a.m.
ii 3:30 p.m.

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