

# ANSWERS

## Chapter 1

### SkillCheck

- 1 a 16 b 144 c 900 d 4.41  
e 106.09 f 25 g 169 h 18.92
- 2 a 4 b 8 c 10 d 14  
e 11 f 7 g 1.1 h 1.5
- 3 a 25 cm b 28 cm c 76 mm
- 4 a 40 cm<sup>2</sup> b 16 cm<sup>2</sup> c 100 mm<sup>2</sup>
- 5 a 10.3 b 4.7 c 7.7 d 0.9
- 6 a 7.6 b 10.8 c 12.7

### Exercise 1.01

- 1 a 14 b 30 c 8  
d 25 e 11 f 19
- 2 a 3.46 b 6.71 c 31.64  
d 18.03 e 12.37 f 14.39  
g 9.90 h 29.80 i 4.90  
j 10.49 k 17.23 l 26.25
- 3 a 10.91 b 8.60 c 12.53  
d 12.04 e 7.42 f 9.85  
g 4.46 h 10.29 i 31.49
- 4 A
- 5  $\sqrt{98}$ ,  $\sqrt{160}$ ,  $\sqrt{52}$ ,  $\sqrt{77}$ ,  $\sqrt{18}$ ,  $\sqrt{200}$

### Exercise 1.02

- 1 a  $p$  b  $z$  c  $LN$
- 2 b 13 cm c 169 d 169  
e 13, 169, 5, 12, 169
- 3 B
- 4 b

	Shorter sides		Hypotenuse $c$	$a^2$	$b^2$	$a^2 + b^2$	$c^2$
	$a$	$b$					
a	6	8	10	36	64	$36 + 64$	100
b	2.5	6	6.5	6.25	36	$6.25 + 36$	42.25
c	1.5	2	2.5	2.25	4	$2.25 + 4$	6.25
d	4	7.5	8.5	16	56.25	$16 + 56.25$	72.25

- 5 Teacher to check.

### Exercise 1.03

- 1 D
- 2 a  $p^2 = m^2 + n^2$  b  $t^2 = r^2 + s^2$   
c  $LK^2 = JL^2 + JK^2$  d  $5^2 = d^2 + 3^2$   
e  $12.5^2 = 10^2 + 7.5^2$  f  $x^2 = 3^2 + 3^2$
- 3 a  $b = 10$  b  $d = 25$  c  $x = 15$
- 4 a  $m = \sqrt{865}$  b  $b = \sqrt{52}$  c  $x = \sqrt{569}$   
d  $p = \sqrt{2}$  e  $d = \sqrt{19.4}$

- 5 a  $m = 29.4$  b  $b = 7.2$  c  $x = 23.9$   
d  $p = 1.4$  e  $d = 4.4$
- 6 D
- 7 a  $b = 7.81$  b  $p = 7.94$  c  $z = 3.02$
- 8 12.5 cm
- 9 a 40 b 39 c 41  
d 28 e 11 f 8  
g 45 h 6, 8 i 9, 12

### Exercise 1.04

- 1 a  $x = 12$  b  $y = 16$  c  $y = 8$   
d  $a = 15$  e  $d = 18$  f  $x = 12$
- 2 a  $x = \sqrt{8}$  b  $y = \sqrt{84}$  c  $m = \sqrt{13\,321}$   
d  $y = \sqrt{13}$  e  $x = \sqrt{94\,176}$  f  $x = \sqrt{128}$
- 3 a  $x = 2.8$  b  $y = 9.2$  c  $m = 115.4$   
d  $y = 3.6$  e  $x = 306.9$  f  $x = 11.3$
- 4 B
- 5 a  $k = 10.39$  b  $q = 25.16$  c  $a = 28.28$
- 6 30 cm 7 Teacher to check

### Mental skills 1

- 2 a 625 b 3025 c 2025 d 7225  
e 13 225 f 56.25 g 9025 h 38 025  
i 2.25 j 4225 k 24 025 l 60 025
- 4 a 441 b 10 201 c 961 d 8281  
e 26.01 f 6561 g 3721 h 40 401  
i 1.21 j 16.81

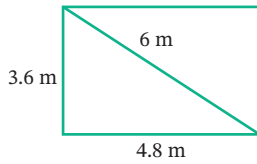
### Exercise 1.05

- 1 a H b S c H  
d S e H f S
- 2 a  $f = 85$  b  $b = 4$  c  $s = 55$   
d  $r = 4.5$  e  $l = 29$  f  $k = 38$
- 3 a  $g = \sqrt{130}$  b  $t = \sqrt{160}$  c  $x = \sqrt{735}$
- 4 a  $q = 62.2$  b  $a = 21.0$  c  $p = 4.7$
- 5 B
- 6 a  $i = 12.59$  b  $y = 27.97$  c  $v = 54.38$
- 7 a  $d = \sqrt{74}$  b  $x = \sqrt{60}$  c  $x = \sqrt{288}$   
d  $p = \sqrt{85}$  e  $x = \sqrt{164}$  f  $p = \sqrt{560}$   
g  $x = \sqrt{16.65}$  h  $x = \sqrt{624}$  i  $y = \sqrt{786.25}$

### Exercise 1.06

- 1 a right-angled b right-angled  
c not right-angled d right-angled  
e not right-angled f right-angled  
g not right-angled h right-angled  
i not right-angled j right-angled  
k not right-angled l right-angled
- Teacher to check diagrams.

2 a



b Yes,  $6^2 = 36$  and  $4.8^2 + 3.6^2 = 36$

### Exercise 1.07

- 1 a, b, c, e, g, h are Pythagorean triads.  
 2 D **3-4** Teacher to check.  
 5 a 12, 13  
 b  $a = 5, b = 12, c = 13$   
 $a^2 + b^2 = 5^2 + 12^2 = 25 + 144 = 169$   
 $c^2 = 13^2 = 169$   
 hence  $a^2 + b^2 = c^2$ , so it is a Pythagorean triad.  
 6 a 7, 24, 25 b 11, 60, 61  
 c 15, 112, 113 d 4, 7.5, 8.5  
 e 9, 40, 41 f 19, 180, 181  
 g 10, 49.5, 50.5 h 51, 1300, 1301

### Exercise 1.08

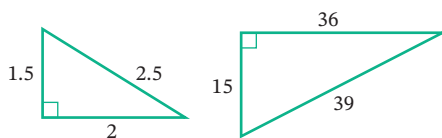
- 1 3.61 m 2 92.2 km 3 B  
 4  $\sqrt{72}$  5 9.7 m 6 68.7 cm  
 7 a 48 cm b 31.38 cm c 170 cm  
 d 12.92 m e 28.94 m  
 8  $h = 10.39$  cm 9 6.32 m 10 16 m  
 11 a 192 cm<sup>2</sup> b 360 mm<sup>2</sup> c 84 mm<sup>2</sup>  
 d 22 m<sup>2</sup> e 123.0 cm<sup>2</sup>  
 12 38 m 13 23 cm  
 14 4.58 m or 458 cm

### Power plus

- 1 a 22.6 b 10.6 c 27.7  
 d 5.4 e 10.3 f 2.8  
 2 a 16.2 m b 16.9 m  
 3 a 21.2 cm b 26.0 cm  
 4 18.4 cm

### Test yourself 1

- 1 a 14.25 b 16.16 c 5.74 d 6.21  
 2  $\sqrt{104}, \sqrt{96}, \sqrt{12}, \sqrt{45}, \sqrt{88}$   
 3 a  $BC, BC^2 = AB^2 + AC^2$  b  $d, d^2 = e^2 + f^2$   
 c  $s, s^2 = h^2 + k^2$   
 4 a  $c = \sqrt{41}$  b  $p = \sqrt{1325}$  c  $x = \sqrt{914}$   
 5 a  $m = 0.99$  b  $f = 10.58$  c  $r = 4.87$   
 6 a  $z = 145.0$  b  $y = 7.0$  c  $v = 42.6$   
 7 a right-angled b right-angled



c not right-angled

8 a, c, d are Pythagorean triads.

9 206 mm

10 a 9.5 m b 152.2 cm

## Chapter 2

### SkillCheck

- 1 a Missing numbers are  $-6, -4, -3, -1, 1, 2, 4, 6, 7, 9$   
 b Missing numbers are  $-35, -30, -25, -15, -10, 5$   
 2  $-7, -5, -2, 0, 1, 6, 7, 11$  3 12, 8, 5, 4, 2,  $-1, -3, -9$   
 4 a 7 b 8 c 1  
 5 a  $\frac{3}{100}$  b  $\frac{7}{1000}$  c  $\frac{49}{100}$  d  $\frac{9}{10}$   
 6 a 3 b 1 c 2 d 5  
 7 a 1, 3, 5, 15 b 15, 30, 45, 60, 75  
 8 a prime b prime  
 c composite d composite

### Exercise 2.01

- 1 a 331 b 157 c 1587 d 255  
 e 421 f 413 g 368 h 734  
 i 612 j 35 k 276 l 47  
 2 a 119 b 112 c 233  
 d 95 e 250 f 242  
 3 A  
 4 a 36 b 54 c 24 d 62  
 e 28 f 43 g 81 h 146  
 i 36 j 18 k 68 l 14  
 m 43 n 172 o 26 p 99  
 5 a 233 b 1375 c 85  
 6 a 24 b 16 c 35 d 54  
 e 36 f 40 g 64 h 21  
 i 24 j 36 k 27 l 28  
 7 a 7 b 5 c 4 d 9  
 e 9 f 4 g 3 h 9  
 i 4 j 9 k 3 l 5  
 8 a 800 b 90 c 700 d 160  
 e 100 f 1000 g 1500 h 240  
 i 180 j 320 k 1700 l 1400  
 9 a 160 b 3500 c 18 000 d 300  
 e 210 f 1800 g 36 000 h 2400  
 i 30 j 6 k 5 l 8  
 m 20 n 100 o 7 p 3  
 10 C  
 11 a 170 b 78 c 228 d 112  
 e 128 f 264 g 324 h 116  
 i 54 j 122 k 109 l 26  
 12 a 280 b 400 c 132 d 260  
 e 210 f 63 g 192 h 324  
 13 a 110 b 70 c 1400 d 540  
 e 1100 f 2600 g 16 h 18  
 i 8 j 40 k 82 l 14  
 14 1140 words  
 15 a 306 b 459 c 216 d 576  
 e 396 f 451 g 768 h 264



- 7 a 68.91 b 107.06 c 3.60 d 4.71  
e 3.20 f 33.00 g 19.73 h 11.25
- 8 a 9.704 b 13.168 c 0.083 d 53.094
- 9 a \$460.40 b \$460 c \$460.4  
d \$460.40 e \$460.395
- 10 a 164.91 b 25.36 c 72.6 d 91.61  
e 15.7 f 77.27 g 18.44 h 2.68  
i 66.68 j 51.61 k 4.64 l 2.391
- 11 C 12 7.6°C 13 0.8 m
- 13 a \$10.05 b \$9.95
- 14 a 3.04 b 12.74 c 5.45 d 0.889  
e 4.326 f Teacher to check.

### Exercise 2.06

- 1 a 26 b 4.05 c 11.5 d 27.3  
e 0.21 f 0.088 g 0.02 h 1.26  
i 28.35 j 88.97 k 0.806 l 0.3672
- 2 B 3 \$40.16
- 4 a 6.2 b 16.3 c 2.61 d 0.139  
e 316.5 f 69.55 g 370 h 58.05  
i 0.58 j 5.2 k 170 l 1.2
- 5 B
- 6 a 43.44 m b 1.81 m
- 7 a 5.91 b 14 c 5.66
- 8 \$67.50
- 9 a 8 b 2 c 0.04  
d 0.9 e 13.9 f 25.92
- 10 16.2 km 11 \$14.10
- 12 a 41.04 b 0.829 c 328.24  
d 4.7292 e 2.51706

### Exercise 2.07

- 1 a 0.4 b 0.375 c 0.75 d 1  
e 0.5 f 0.75 g 0.6 h 0.25  
i 0.625 j 0.875 k 0.5 l 1
- 2 They are equivalent fractions.
- 3 a 0.6̇ b 4.27̇ c 0.28̇ d 3.83̇  
e 9.607̇ f 0.1519̇ g 0.052̇ h 12.234̇
- 4 a 0.858333... b 0.1656565...  
c 0.272727... d 0.461538461538...
- 5 a 0.1̇ b 0.16̇ c 0.83̇  
d 0.142857̇ e 0.6̇ f 0.285714̇  
g 0.2̇ h 0.428571̇ i 0.571428̇  
j 0.4̇ k 0.6̇ l 0.5̇  
m 0.857142̇ n 0.7̇ o 0.714285̇
- 6 0.142857̇, 0.285714̇, 0.428571̇, 0.571428̇,  
0.714285̇, 0.857142̇. It's the same digits, in order,  
but starting with a different digit each time.
- 7 a 3.6̇ b 1.71̇ c 531.18̇ d 3.26̇

### Mental skills 2B

- 2 a 0.5 b 90 c 8 d 0.9  
e 90 f 0.7 g 8 h 30  
i 0.08 j 3.5 k 4 l 0.3

- 4 a 16 b 160 c 1.6 d 1.6  
e 1.6 f 16 g 160 h 0.16  
i 0.016 j 160 k 0.16 l 0.0016

### Exercise 2.08

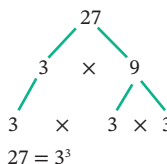
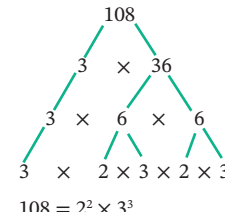
- 1 a  $7^3$  b  $4^5$  c  $5^{10}$  d  $(-8)^7$
- 2 a 64 b 8 c -216 d 81  
e 7 f -32 g 1000 h 256  
i 1 771 561 j 18 954 k 972  
l 2529 m 39 n 4094
- 3 a 3 b 3 c 2  
d 6 e 3 f 5
- 4 B 5  $100^3$  6  $2^{10}$
- 7 a 36 b 36  
c Yes, they both equal 36.
- 8 a 400 b 400 c Yes
- 9 a  $3^2 \times 8^2$  b  $a^2 \times b^2$
- 10 a  $6^2 \times 3^2 = 324$  b  $2^2 \times 11^2 = 484$   
c  $(2 \times 8)^2 = 2^2 \times 8^2 = 256$   
d  $(3 \times 5)^2 = 3^2 \times 5^2 = 225$   
e  $(10 \times 3)^2 = 10^2 \times 3^2 = 900$   
f  $(4 \times 7)^2 = 4^2 \times 7^2 = 784$
- 11 a 28 b 16 c 17 d 33  
e 2 f 7 g 13 h 6
- 12 a 6.1 b 9.7 c 22.4 d 1.9  
e -7.9 f 44.7 g 1.0 h 10.3

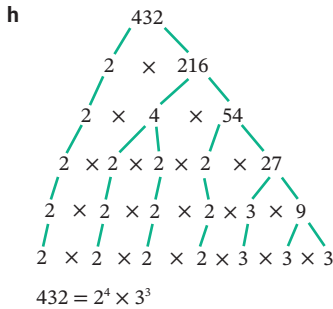
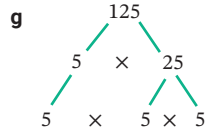
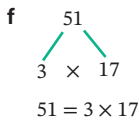
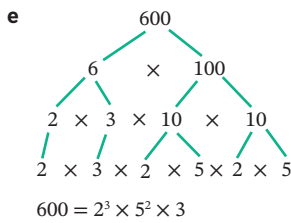
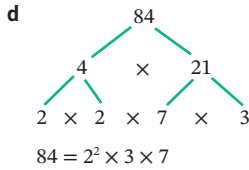
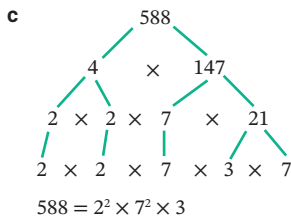
13

Number, $x$	1	2	3	4	5	6	7	8	9	10	11	12
Number squared, $x^2$	1	4	9	16	25	36	49	64	81	100	121	144
Number cubed, $x^3$	1	8	27	64	125	216	343	512	729	1000	1331	1728

- 14 D 15 D 16 3 and 4
- 17 a 5.7 b 10.2 c 8.2
- 18  $\sqrt{6}$   $\sqrt{62}$   $\sqrt{14}$   $\sqrt[3]{181}$   $\sqrt[3]{49}$   $\sqrt[3]{674}$
- 19 a 10 b 10 c The answer is the same.
- 20 a 9 b 9  
c The answer is the same.
- 21 a  $\sqrt{16} \times \sqrt{9}$  b  $\sqrt{a} \times \sqrt{b}$
- 22 a  $2 \times 4 = 8$  b  $\sqrt{9} \times \sqrt{49} = 3 \times 7 = 21$   
c  $\sqrt{36} \times \sqrt{4} = 6 \times 2 = 12$   
d  $\sqrt{81} \times \sqrt{25} = 9 \times 5 = 45$

### Exercise 2.09

- 1 a  b 



- 2** C      **3** Teacher to check.
- 4** a 4      b 7      c 5      d 15  
 e 6      f 24      g 16      h 6
- 5** a 15      b 26      c 11
- 6** a 72      b 12      c 110      d 28  
 e 30      f 24      g 45      h 110
- 7** a 90      b 252      c 80
- 8** a 45      b 21      c 16  
 d 16      e 9      f 18
- 9** Teacher to check.
- 10** a 4      b 532

### Exercise 2.10

- 1** a  $6^5$       b  $4^7$       c  $2^{11}$       d  $8^{10}$   
 e  $11^8$       f  $7^{10}$       g  $5^7$       h  $6^{16}$   
 i  $2^9$       j  $5^9$       k  $2^{14}$       l  $3^{16}$

- 2** D
- 3** a  $5^6 = 15\,625$       b  $7^8 = 5\,764\,801$   
 c  $3^{13} = 1\,594\,323$       d  $4^6 = 4096$   
 e  $9^7 = 4\,782\,969$       f  $6^9 = 10\,077\,696$   
 g  $8^{10} = 1\,073\,741\,824$       h  $7^4 = 2401$
- 4** a  $2^4$       b  $3^2$       c  $7^6$       d  $2^5$   
 e  $5^2$       f  $10^4$       g  $11^7$       h  $6^7$   
 i 2      j  $16^6$       k  $35^{11}$       l 20
- 5** D
- 6** a  $2^4 = 16$       b  $5^2 = 25$       c  $4^3 = 64$   
 d  $10^5 = 100\,000$       e  $8^3 = 512$   
 f  $6^8 = 1\,679\,616$   
 g 11      h  $3^6 = 729$

**7**

Number, $n$	$n^2$	$n^3$	$n^4$	$n^5$	$n^6$
2	4	8	16	32	64
3	9	27	81	243	729
4	16	64	256	1024	4096
5	25	125	625	3125	15 625

- 8** a 32      b 81      c 125      d 3125  
 e 4096      f 1944      g 64      h 3125  
 i 9      j 2      k 4      l 1
- 9** a  $5^4$       b  $3^7$       c  $2^3$
- 10** a  $a^{10}$       b  $x^6$       c  $b^5$       d  $y^5$   
 e  $d^4$       f  $x^2$       g  $a$       h  $r^4$

### Exercise 2.11

- 1** a  $2^{18}$       b  $5^6$       c  $7^{20}$       d  $8^{14}$   
 e  $3^{24}$       f  $9^{24}$       g  $6^{14}$       h  $11^{25}$   
 i  $8^{30}$       j  $4^{45}$       k  $(-2)^{28}$       l  $(-7)^{18}$
- 2** D
- 3** a  $5^8 = 390\,625$       b  $2^{15} = 32\,768$   
 c  $3^{18} = 387\,420\,489$       d  $6^{12} = 2\,176\,782\,336$   
 e  $7^6 = 117\,649$       f  $4^{12} = 16\,777\,216$   
 g  $8^0 = 1$       h  $4^9 = 262\,144$
- 4** a 1      b 1      c 1      d 1  
 e 1      f 1      g 1      h 6  
 i 1      j 7      k 1      l 3  
 m 1      n 2      o 6      p 9
- 5** B
- 6** 1, 2, 8, 16, 64, 128, 256, 512, 2048, 4096
- 7** a 64      b 4096      c 16      d 512  
 e 1      f 256      g 1      h 128
- 8** a  $(6^2)^4 = 6^8$       b  $(5^3)^3 = 5^9$   
 c  $(10^6)^3 = 10^{18}$ , other possible answers
- 9** a  $a^8$       b  $x^{36}$       c  $d^{10}$       d  $n^{18}$   
 e 1      f 4      g 1      h 0

### Power plus

- 1** a 9      b  $2\sqrt{2}$       c  $3\sqrt{3}$       d  $5\sqrt{2}$   
 e  $6\sqrt{2}$       f  $3\sqrt{5}$       g  $6\sqrt{5}$       h  $8\sqrt{2}$   
 i  $2\sqrt{7}$       j  $10\sqrt{2}$       k  $4\sqrt{3}$       l  $7\sqrt{5}$
- 2** a  $2^{-1}$       b  $\frac{1}{2}$       c  $\frac{1}{2}$       d  $\frac{1}{2^2} = \frac{1}{4}$

- 3 a Yes  
c For odd values of  $n$ .
- 4 a 24 000      b 455 000      c 0.0933  
d 0.0638      e 8 700 000      f 0.005 82  
g 0.126      h 2690      i 314 000 000
- 5 a  $1.2 \times 10^4$       b  $3.45 \times 10^8$       c  $7 \times 10^{-3}$   
d  $4 \times 10^3$       e  $5 \times 10^{-4}$       f  $4.1 \times 10^{-4}$   
g  $1.92 \times 10^6$       h  $3.61 \times 10^{-4}$       i  $6.37 \times 10^{-8}$
- 6 Teacher to check.

### Test yourself 2

- 1 a 1400      b 210      c 160      d 131  
e 87      f 385      g 260      h 480  
i 276      j 800      k 276      l 42  
m 9      n 2800      o 333      p 90  
q 48      r 725      s 160
- 2 a 116      b 94      c 22      d 93
- 3 a 2      b 7      c -11      d 0
- 4 9237 m      5 23°C
- 6 a -14      b 24      c 49      d -80
- 7 a -9      b -4      c -12      d 3
- 8 a 57      b 29      c 3  
d 62      e  $\frac{1}{5}$       f 5
- 9 0.471, 0.47, 0.417, 0.147
- 10 a 0.5      b 13.11      c 98.427
- 11 12.2 m
- 12 a 30.5      b 19.72      c 10.4      d 3.3  
e 0.923      f 6.25      g 2.3925      h 11.6
- 13 15 bottles
- 14 a 0.2      b 0.875      c 0.16
- 15 a 343      b 161 051      c 625  
d 20      e 3      f -5
- 16 5.6
- 17 a 2, 2, 4, 100, 400      b 4, 2, 7, 14
- 18 a 6      b 140
- 19  $132 = 2^2 \times 3 \times 11$ ,  $88 = 2^3 \times 11$ , HCF =  $2 \times 2 \times 11 = 44$
- 20  $12 = 2^2 \times 3$ ,  $45 = 3^2 \times 5$ , LCM =  $2^2 \times 3 \times 3 \times 5 = 180$
- 21  $784 = 2^4 \times 7^2$ ,  $\sqrt{784} = 2^2 \times 7 = 28$
- 22 a  $4^7$       b  $6^{11}$       c  $12^8$       d  $9^4$   
e  $2^4$       f  $5^3$       g 3      h  $6^{12}$
- 23 a  $3^8$       b  $7^{10}$       c  $6^9$       d  $3^{15}$
- 24 a 1      b 1      c 4      d 8  
e 1      f 1      g 1      h 0

## Chapter 3

### SkillCheck

- 1 a -1      b 4      c -10      d 5  
e -18      f 3      g -13      h 32  
i 36      j 8      k -1      l 18
- 2 a  $7p$       b  $ab$       c  $k^2$       d  $n^3$   
e  $2mp$       f  $dkp$       g  $6y$       h  $3qt$   
i  $-d$       j  $3q$       k  $4a$       l  $x$

- 3 a +      b  $\times$       c -      d  $\div$   
e -      f +      g +      h -
- 4 a 10      b 24      c 6      d 10  
e 16      f 7      g 25      h 20  
i 4      j 4      k 20      l 42
- 5 a 13      b 18      c 16  
d 3      e 21      f 8

### Exercise 3.01

- 1 a  $5w$       b  $m^2$       c  $3abc$       d  $6k$   
e  $\frac{m}{8}$       f  $3f$       g  $16m$       h  $21wx$   
i  $9p$       j  $4t^2$       k  $d$       l  $16bcd$   
m  $\frac{26}{n}$       n  $9h^2$       o  $20x$       p  $a$   
q  $8q$       r  $12cn$       s  $-6d^2r$       t  $3a + 2c$   
u  $a^3x^2$
- 2 a  $\frac{13}{2a}$       b  $9 + 4m$       c  $\frac{e-6}{5}$   
d  $4t - 8$       e  $y^2 + z^2$       f  $\frac{k}{9} - n$   
g  $\frac{p}{n+9}$       h  $22 - \frac{e}{2}$       i  $11 + 11u^2$
- 3 A      4 Teacher to check.
- 5 B
- 6 a  $8 \times s \times t$       b  $-2 \times y \times y$   
c  $8 \div f$       d  $r \times r + t \times t$   
e  $4 \times b \times b \times d$       f  $5 \times x \times y - 2 \times a$   
g  $(x-2) \div 3$       h  $q \times q \times q$   
i  $16 - 2 \times d \times d$       j  $-4 \times d \div 3$   
k  $h \times h \times i \times i$       l  $4 \times j - 9 \div d$
- 7 D







### Exercise 3.02

- 1 a  $5n$       b  $n + 6$       c  $\frac{n}{10}$       d  $n + 1$   
e  $\frac{n}{2}$       f  $n - 20$       g  $n^2$       h  $20 - n$   
i  $n - 1$       j  $2n$       k  $\frac{6}{n}$       l  $n - 8$   
m  $-4n$       n  $\sqrt{n}$
- 2 a  $a + b + c$       b  $ab$       c  $b - c$   
d  $ac + b$       e  $3b + a$       f  $\frac{c}{b}$   
g  $a - b$       h  $5 + bc$       i  $b - c$   
j  $\frac{ab}{c}$       k  $\sqrt{a+c}$       l  $ab - 7c$
- 3 D
- 4 a  $3y + 8$       b  $\frac{p}{3} - 6$       c  $4M + 27$   
d  $\frac{5k}{2}$       e  $\frac{x}{6} + 13$       f  $\frac{B}{2} - 2$   
g  $\frac{R}{9} + 10$       h  $21n$
- 5 a  $x$  plus  $y$  minus  $z$       b 5 times  $K$  plus  $L$   
c  $x$  times  $y$  minus 3      d  $W$  divided by 5  
e 3 times  $x$ , minus 1  
f  $y$  minus  $x$ , then divided by 10  
g 2 times  $N$ , plus 21      h 7 minus  $e$
- 6 a  $t - b$       b  $\frac{n}{5}$       c  $y - 3p$       d  $2r + 9$   
e  $\frac{a}{12}$       f  $4x$       g  $\frac{160}{r}$       h  $5x + 3y$

### Exercise 3.03

- 1 C  
 2 a 8      b 12      c 4      d 10  
 e 30      f 12      g 0      h 8  
 i 5      j 19      k -3      l 3  
 3 a -150      b 25      c -27      d 2  
 e -15      f 75      g -21      h 6  
 i 18      j -10      k -90      l  $\frac{1}{2}$   
 4 B  
 5 a -13      b -3      c 10      d -5  
 e  $-\frac{1}{4}$       f 1      g  $\frac{1}{3}$       h 5  
 6 C      7  $a = 42 \text{ m}^2$       8 \$212  
 9 78.8°F      10 14 hours      11 \$5900  
 12 a i 31 minutes      ii 56 minutes  
 b 8:10 am

### Exercise 3.04

- 1 a  $x + 2$       b  $2x + 3$   
 c  $2 + 2x$       d  $3x + 4$   
 e  $x + 1 + x + 1$  or  $2x + 2$   
 f  $2 + x + 2 + 2x$  or  $3x + 4$   
 g  $1 + x + 3$  or  $x + 4$   
 h  $2x + 2 + 2x + 1$  or  $4x + 3$   
 i  $x + 3 + x$  or  $2x + 3$   
 j  $4x + 5$   
 2 a  $x + y + 2$       b  $2x + 2y + 1$       c  $x + 2y$   
 d  $2x + 2y + 3$       e  $x + 2y + 2$       f  $2x + 3y + 4$   
 g  $x + y$       h  $2x + 3y + 1$   
 3 a       b   
 c       d   
 e       f   
 4 B  
 5 a D      b A      c F  
 d B      e C      f E  
 6 a D      b F      c A  
 d B      e C      f E  
 7 a  $m + 2p$       b  $m + p$       c  $3p + 5$   
 d  $2m + 2p + 1$       e  $m + 2p$   
 8 C  
 9 a  $4a + 5d$       b  $5h + 9r$       c  $e$   
 d  $4k - 3$       e  $2x + 6z$       f  $2p + s$   
 g  $4u + 12$       h  $4n - 1$       i  $3i$

### Mental skills 3A

- 2 a 720      b 486      c 825      d 128  
 e 560      f 216      g 189      h 432  
 i 560      j 616      k 135      l 675

### Exercise 3.05

- 1 a  $4p, 2p, p$       b  $m^2, 3m^2$       c  $5ac, 7ca$   
 d  $vw, 2wv$  and  $5v, 9v$       e  $6pq, 2qp, 3pq$   
 f  $2d, 3d$       g  $4mn, 2nm, mn$   
 h  $x^2y, 4x^2y$       i  $5ba, ab$   
 2 C  
 3 a  $11k$       b  $7mn$       c  $2xy$       d  $9abc$   
 e  $6x^2$       f  $5ef^2$       g  $5d$       h  $5mk$   
 i  $4xy$       j  $-4de$       k  $3k^2$       l  $3w^2$   
 4 C  
 5 a  $5k + 4j$       b  $9ab + 2$       c  $7m^2 + 2m$   
 d  $10s^2 - 7st$       e  $10mn$       f  $9k + 3$   
 g  $2y^2$       h  $12d - 4e$       i  $4 - 2x$   
 j  $8bg$       k  $9 - 2q$       l  $5a + 2c$   
 6 a  $3x - 3y$       b  $4ab + 3bc$       c  $9k^2 + 11$   
 d  $6bc - 9a$       e  $x^2 - 7x + 7$       f  $4p^2$   
 g  $12y + 14$       h  $7r + 3s$       i  $7b + 6g$   
 j  $6x^2 - 13x + 6$       k  $52a$       l  $7q - 7$   
 m  $-6y$       n 12  
 7 C  
 8, 9 Teacher to check.

### Exercise 3.06

- 1 D  
 2 a  $15y$       b  $16m$       c  $4km$       d  $20t$   
 e  $12f$       f  $16xy$       g  $30mp$       h  $18bd$   
 i  $12d^2$       j  $120mn$       k  $48y^2$       l  $27r^2$   
 m  $72ab$       n  $x^2y^2$       o  $42jk$       p  $10r^2s^2t$   
 q  $18ac^2d$       r  $h^2j^3k^2$       s  $24p^2q^2$       t  $6m^2n^2$   
 3 a  $-8bd$       b  $-24m^2$       c  $-90kl$       d  $-60p$   
 e  $-63k$       f  $75b^2$       g  $-12m^2n^2$       h  $-12a^2b^2c$   
 i  $40r^2$       j  $-216d^2e$       k  $144x^2$       l  $-40m^2$   
 4 B  
 5 a  $y^4$       b  $a^3$       c  $2c^2$       d  $t^5$   
 e  $7q^3$       f  $k^3l^2$       g  $m^3n^2$       h  $-5p^4k^3$   
 i  $-3y^3$       j  $-d^2e^2f$       k  $4q^2r^4$       l  $11p$   
 m  $35mn$       n  $a^2$       o  $2ry$       p  $-27p$   
 6 Teacher to check.

### Exercise 3.07

- 1 A  
 2 a  $4m$       b  $9e$       c  $-7p$       d  $9x$   
 e  $4w$       f 8      g -5      h  $\frac{3}{4}$   
 i  $2p$       j -7      k  $\frac{p}{5}$       l  $-\frac{7n}{m}$   
 3 a  $2m^2$       b  $-3e$       c  $-5p$       d  $7x$   
 e  $-2w$       f  $4m$       g  $-8ky$       h  $\frac{3}{4}$   
 i  $5de$       j  $a$       k  $-8a$       l  $-2m$   
 4 D  
 5 a -3      b -3      c  $-15y^3$       d  $6e$   
 e  $6x^2$       f  $8mn$       g 3      h  $3a$   
 i  $\frac{a}{5c}$       j  $2d$       k  $\frac{5p}{m}$       l 1  
 m  $8x$       n  $9r + 14$       o  $18p$

6 Teacher to check.

7 a  $4w^2$  b 0

### Exercise 3.08

1 D

2 a  $m^7$  b  $k^9$  c  $y^{10}$  d  $x^8$   
e  $n^8$  f  $q^{10}$  g  $b^{16}$  h  $s^{15}$   
i  $42k^6$  j  $20y^4$  k  $3d^9$  l  $55e^4$   
m  $h^{10}n^7$  n  $-30c^6d^5$  o  $f^8g^{11}$  p  $-10p^7q^2$

3 A

4 a  $y$  b  $p^3$  c  $q^3$  d  $n^5$   
e  $k^2$  f  $x^2$  g 1 h  $m^5$   
i  $q$  j  $9g^4$  k  $3p^4$  l  $a^5$   
m  $11xy$  n  $x^3$  o  $7k^3l^5$  p  $\frac{5e^2}{7f}$

5 B

6 a  $y^{16}$  b  $x^{10}$  c  $y^9$  d  $m^{18}$   
e  $k^{21}$  f  $t^{40}$  g  $9m^2$  h  $8m^{12}$   
i  $x^3y^3$  j  $p^{12}q^4$  k  $81h^{16}$  l  $k^{15}z^5$   
m  $16k^4j^4$  n  $16c^6d^2$  o  $125x^6y^{24}$  p  $64m^{24}p^{12}$

7 a 1 b 1 c 1 d 5

e 1 f 1 g 1 h  $h^2$   
i  $\frac{b^6}{2}$  j  $16x^2$  k 1 l  $13x$   
m  $3m+1$  n  $3b^2$  o 32 p  $\frac{1}{2}$

8 a  $\frac{1}{3pq}$  b  $2mn$  c  $\frac{2}{3y}$

### Mental skills 3B

2 a 176 b 363 c 261 d 405  
e 682 f 707 g 1818 h 3564  
i 152 j 540 k 2142 l 588

### Exercise 3.09

1 a  $5m+15$  b  $8m-16$  c  $2j+20$   
d  $3a+6$  e  $4h-28$  f  $6x+6y$   
g  $36-9b$  h  $11y-66$  i  $8k+20$   
j  $15m-6$  k  $18x+24$  l  $20a+50b$

2 a  $-3n-12$  b  $-4v+20$  c  $-7d-21$   
d  $-10k+20$  e  $-2d-2e$  f  $-25+5z$   
g  $-6h-6$  h  $-m+1$  i  $-45-18x$   
j  $-2f-3$  k  $-3u+3v$  l  $-32+8k$

3 B

4 a  $xy+6x$  b  $pq-2p$  c  $a^2+4a$   
d  $3b^2-b$  e  $d^2+3de$  f  $8m+10n$   
g  $15k^2-10k$  h  $21j^2+7ijk$  i  $4x^2+xy$   
j  $-8p+6q$  k  $k^2-12k$  l  $-4m+m^2$   
m  $8n^2+20mn$  n  $2x-14x^2$  o  $-2f^2-4f$   
p  $-5j+7k$

5 C

6, 7 Teacher to check.

9 a  $6a+26$  b  $6k+6$  c  $3q-4m$   
d  $6p-22$  e  $4-2y$  f  $17-7t$   
g  $12h+5$  h  $-8x+8$  i  $18n+4$

10 Teacher to check.

11 a  $5a+14$  b  $8x+4$  c  $17k+18$   
d  $22t+11$  e  $n+7$  f  $4d+2$

g  $22y+23$  h  $-2p-7$  i  $m^2+4m+3$

j  $7d+e$  k  $6f^2+4$  l  $-38e^2+e$

12 a  $x+5$  b  $r-3$  c  $8k-3$

d  $2a+7$  e  $y+9$  f  $2t-7$

### Exercise 3.10

1 a 1, 3, 5, 15 b 1, 2, 4, 8  
c 1, 17 d 1, 5, 25

e 1, 5, 11, 55 f 1, 2, 3, 6, 7, 14, 21, 42

2 a 3 b 2 c 6 d 4 e 11

f 5 g 3 h 15 i 16

3 Teacher to check. 4 C

5 a  $3x$  b  $4j$  c  $2x$  d  $7k$

e 5 f  $4m$  g  $16c$  h  $de$

i 9 j 3 k  $2m$  l  $4y$

m a n 32 o  $5w$  p  $2xy$

q d r  $12t$

6 C

### Exercise 3.11

1 a 2 b 4 c x d y

2 a  $x+2$  b  $p-4$  c  $4k-5$  d  $j-4k$

e  $x^2+y^2$  f 5 g 6 h 2

i 2 j  $3x+1$  k  $y+z$  l  $b-c$

m  $q-1$  n  $b+d$  o  $a+2$  p h

q n r y s k t f

3 a  $4(x+2)$  b  $3(m+2)$  c  $5(a-2)$

d  $5(3m-2a)$  e  $4(2x-y)$  f  $4(3m-4w)$

g  $h(k-1)$  h  $x(2y-m)$  i  $p(12+5r)$

j  $x(x+5)$  k  $m(4-m)$  l  $y(y-11)$

4 C

5 a  $m+n$  b  $2y-1$  c  $2p+1$

d  $n-p$  e  $y-4$  f  $q+r$

g  $7-y$  h  $4k+1$  i  $3x-4z$

6 D

7 a  $7a(b+2)$  b  $2x(1-3y)$  c  $3m(1-3w)$

d  $5x(2y-5w)$  e  $4m(2a-3p)$  f  $3y(3x+2m)$

g  $3x(1+3y)$  h  $ab(1+c)$  i  $xy(z+a)$

j  $6m(3-4n)$  k  $ac(2+3b)$  l  $pq(r+m)$

m  $r(s+7)$  n  $4(s^2+4)$  o  $p(p-2)$

p  $2k(3k^2-1)$  q  $j(3+j)$  r  $n(7-n)$

s  $7e(1+3e)$  t  $6q(1-2q)$  u  $a^2(a^2+1)$

v  $xy(x+y)$  w  $3m(mn+3)$

x  $3abc(4abc+1)$

### Exercise 3.12

1 a  $k+1$  b  $n+p$  c  $r-2$  d  $k-9$

e  $-a$  f  $-y$  g  $-6$  h  $-f$

2 a  $-4(x-3)$  b  $-3(m+3)$  c  $-10(x-2)$

d  $-5(3x-2m)$  e  $-2(3x+4m)$  f  $-5(x+6)$

g  $-a(1+b)$  h  $-4(xyz-2abc)$  i  $-4(5-x)$

j  $-d(x+y)$  k  $-m(2-5p)$  l  $-8(3x+2y)$

3 B

4 a  $-8x(2y+3k)$  b  $-4x(5-3y)$  c  $-4m(2w-3)$

d  $5e(1-3f)$  e  $-ab(1+c)$  f  $xy(a+w)$

- g  $-6c(2 + 3w)$  h  $-rt(2 - 7s)$  i  $5h(4f + 1)$   
 j  $-19w(b + 2)$  k  $-abc(1 - d)$  l  $-abc(1 + d)$
- 5 a 10, 10 b Yes  
 6 A  
 7 a  $a^3bc(a - b)$  b  $2\pi r(r + h)$

### Exercise 3.13

1 a

	$x$	$7$
$x$	$x^2$	$7x$
$2$	$2x$	$14$

$$x^2 + 9x + 14$$

b

	$x$	$1$
$x$	$x^2$	$x$
$5$	$5x$	$5$

$$x^2 + 6x + 5$$

- 2 D  
 3 a  $x^2 + 5x + 4$  b  $x^2 + 9x + 18$   
 c  $x^2 + 9x + 20$  d  $x^2 + 4x + 4$   
 e  $x^2 + 8x + 12$  f  $x^2 + 13x + 30$   
 g  $x^2 + 9x + 8$  h  $x^2 + 14x + 49$   
 i  $x^2 + 3x - 4$  j  $x^2 - x - 6$   
 k  $x^2 - 3x - 4$  l  $x^2 + x - 30$   
 m  $x^2 - 9x + 20$  n  $x^2 + 6x - 27$   
 o  $x^2 - 8x + 15$  p  $x^2 - 14x + 49$
- 4 a i  $x^2 - 9$  ii  $x^2 - 16$  iii  $x^2 - 4$  iv  $x^2 - 49$   
 b  $x^2 - 8^2 = x^2 - 64$
- 5 a  $2x^2 + 6x + 4$  b  $3x^2 + 5x - 2$   
 c  $2x^2 + 5x + 3$  d  $5x^2 - 13x - 6$   
 e  $4x^2 - 11x + 6$  f  $10x^2 - 11x - 6$   
 g  $3x^2 - 10x + 3$  h  $4x^2 - 5x - 21$
- 6 a  $a^2 + 10a + 25$  b  $x^2 + 4x + 4$   
 c  $y^2 + 14y + 49$  d  $x^2 - 6x + 9$   
 e  $4a^2 + 4a + 1$  f  $9a^2 - 30a + 25$
- 7 a  $a^2 + 2ab + b^2$  b  $a^2 - b^2$
- 8 A

### Power plus

- 1 a  $-4p - 9q$  b  $-6m - 3n - 7mn$   
 c  $4j - k + 4$  d  $5b^2$   
 e  $3x^2 - 6x$  f  $5xy + 2yz + 4xz$   
 g  $-4d^2 + 4e^2 + 16$  h  $13f^2 + 6f + 1$
- 2 a i  $4x + 6$  ii  $x^2 + 3x$   
 b i  $4p$  ii  $p^2$   
 c i  $x + y + 16$  ii  $\frac{xy}{2}$   
 d i  $2m + n + 8$  ii  $\frac{n}{2}(2m + 3)$  or  $mn + \frac{3m}{2}$   
 e i  $3x + 2y$  ii  $x^2 + x$   
 f i  $2a + 2b$  ii  $ad + bc - cd$

- 3 a  $x^2 + 2x - 15$  b  $2am - 3m$   
 c  $4y - 9$  d  $6a - 2b + 14c$   
 e  $-5p^2 - 7pq + 10pr$  f  $4k^2 - 5k - 5$   
 g  $27 - 20f + 30g$  h  $-2x^2 + 7x + 115$   
 i  $x^2 + 8x + 15$  j  $p^2 + 9p - 10$
- 4 a  $-2$  b  $-24$  c  $10$  d  $9$   
 e  $8$  f  $4$  g  $7$  h  $4$   
 i  $-1$  j  $3$  k  $1.2$  l  $0$
- 5 a  $p(9q + 5 - 2p)$  b  $11(4k - 3l - m)$   
 c  $x(2 - 7x + 3y)$  d  $(y + 2)(x + 3)$   
 e  $(b - 3)(a - 7)$  f  $(k + 1)(4 - j)$
- 6 a  $m$  b  $\frac{2n}{5}$  c  $k$  d  $\frac{2d}{5}$   
 e  $\frac{3f}{2}$  f  $\frac{7c}{10}$  g  $\frac{6}{x}$  h  $\frac{7b + 5a}{ab}$

### Test yourself 3

- 1 a  $6p$  b  $-r$  c  $4dg$   
 d  $5t$  e  $20m$  f  $5k$   
 g  $6y^2$  h  $\frac{16}{a}$  i  $20cd$
- 2 a  $c \times d$  b  $3 \times y \times y$   
 c  $w \div 6$  d  $c \times c + y$
- 3 a  $y + 4$  b  $6b - 3$  c  $\frac{p}{q}$
- 4 B
- 5 a 3 b  $-10$  c 19  
 d 24 e  $-15$  f 29
- 6 a  $12k$  b  $17d$  c  $17m$   
 d  $18m$  e  $3ac$  f  $9cd$   
 g  $10x + 10y$  h  $15r + 15s$  i  $28h + 7g$
- 7 a  $10x$  b  $14bd$  c  $66m$  d  $24pq$   
 e  $32w^2$  f  $75j$  g  $36m^2$  h  $60p^3$
- 8 a  $25x$  b  $\frac{4b}{d}$  c  $11m$  d  $8rs$   
 e 5 f  $7d^2$  g  $7e$  h  $13b$   
 i  $2x$  j  $4mn^2$  k  $4e$  l  $5ae$
- 9 a  $6n + 12$  b  $-10b - 35c$  c  $9j^2 - 3j$   
 d  $2n + 18$  e  $19v - 15$  f  $9y - 18$
- 10 A
- 11 a 6 b  $3p$  c 7  
 12 a  $3(m + 3)$  b  $5(h - 7)$  c  $3a(2 + 3b)$   
 d  $2h(5 - 6m)$  e  $xy(1 + z)$  f  $d(c - e)$   
 g  $a(a - 6)$  h  $8j(k + 3j)$
- 13 a  $-2(1 + 2q)$  b  $-4(f + 4)$  c  $-3(4 - 5d)$   
 d  $-b(a - 1)$  e  $-8b(2 + 3d)$  f  $-k(4k + 1)$   
 g  $-x(x - 7)$  h  $-hi(h + i)$

### Practice set 1

- 1 a 343 b 1225 c 256  
 d 20 e 14 f 1.5
- 2 a 140 b 135 c 120  
 d 480 e 180 f 15
- 3 a  $x = 5$  b  $y = 41$  c  $x = 6.4$   
 d  $m = 24$  e  $a = 17.7$  f  $p = 33.5$
- 4 a 8 b  $-30$  c  $-20$  d 5  
 e 28 f  $-6$  g  $-2$  h 2  
 i  $-16$  j  $-28$  k 6 l  $-15$

- 5 a 18      b 23      c -3  
 d -11      e 19  
 f -99      g  $4\frac{3}{4}$       h 8      i 2
- 6 a 13      b 9      c 10      d 10
- 7 a  $2k + 4j$       b  $4p$       c  $11p + 5q$       d  $8x + 6y$
- 8 a -4.23      b 22.39
- 9 a 7.2      b 0.45      c 0.42      d 18.4
- 10 a  $k + 5$       b  $20k$       c  $\frac{k}{2}$   
 d  $3k + 10$       e  $k - 12$       f  $k^2$
- 11 a  $10p$       b 6      c  $-12x^2y$   
 d  $24ab$       e 2      f  $2a$
- 12 a  $180 = 2^2 \times 3^2 \times 5$       b  $875 = 5^3 \times 7$
- 13 a 4      b 18
- 14 a  $2^7$       b  $7^{11}$       c  $5^5$       d 8  
 e  $3^8$       f  $11^{15}$       g 1      h 1
- 15 a  $\sqrt{48}$  cm      b 6.93 cm

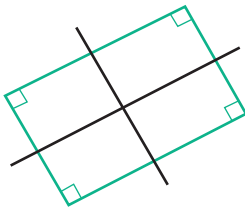


- 16 Right-angled.
- 17 a 36      b 54
- 18 a  $4x + 8$       b  $6m - 24$       c  $-14k - 7$   
 d  $-3p - q$       e  $6m + 4$       f  $4p$
- 19 a  $2(m + 2)$       b  $d(d - 1)$       c  $6(p + 2q)$   
 d  $-12(x + 2)$       e  $a(2b + 3)$       f  $-2x(x - 3)$

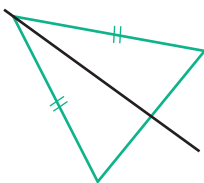
## Chapter 4

### SkillCheck

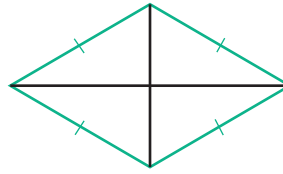
- 1 Teacher to check.
- 2 a acute      b obtuse      c reflex  
 d obtuse      e right      f revolution  
 g reflex      h straight
- 3 a vertically opposite      b right  
 c reflex
- 4 a  $x = 60$       b  $x = 123$       c  $x = 162$
- 5 a rectangle



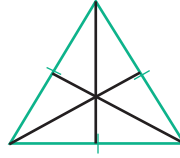
- b isosceles triangle



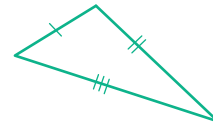
- c rhombus



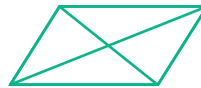
- d equilateral triangle



- 6 a 2      b 1      c 2      d 3  
 7 D      8



- 9 a



- b No

### Exercise 4.01

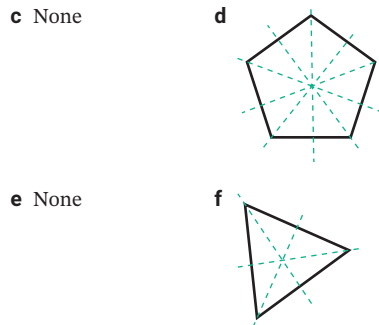
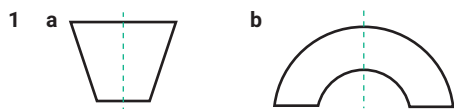
- 1 a complementary      b reflex  
 c supplementary      d obtuse  
 e straight      f vertically opposite  
 g acute      h adjacent  
 i angles at a point
- 2 a  $74^\circ$       b  $57^\circ$       c  $19^\circ$       d  $88^\circ$
- 3 a  $155^\circ$       b  $31^\circ$       c  $73^\circ$       d  $132^\circ$
- 4 D      5 C
- 6 a  $x = 70$  (angles in a right angle)  
 b  $a = 112$  (angles on a straight line)  
 c  $a = 110$  (vertically opposite angles),  $b = 70$  (angles on a straight line)  
 d  $y = 285$  (angles at a point)  
 e  $a = 19$  (angles on a straight line)  
 f  $x = 53$  (adjacent angles)  
 g  $a = 52$  (angles on a straight line),  $b = 128$  (vertically opposite angles),  $c = 52$  (angles on a straight line)  
 h  $x = 165$  (angles at a point)  
 i  $x = 270$  (angles at a point)  
 j  $a = 45$  (vertically opposite angles),  $b = 135$  (angles on a straight line),  $c = 135$  (vertically opposite angles)  
 k  $k = 58$  (angles in a right angle)  
 l  $n = 70$  (angles on a straight line)  
 m  $w = 156$  (angles at a point)  
 n  $q = 62$  (angles on a straight line)  
 o  $y = 40$  (angles at a point)  
 p  $p = 45$  (equal angles in a right angle)  
 q  $p = 62$  (angles on a straight line)  
 r  $a = 23$  (adjacent angles)

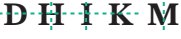





- 7 a  $m = 235$  (angles at a point)  
 b  $m = 270$  (angles at a point)  
 c  $a = 50$  (angles on a straight line)  
 d  $x = 170$  (angles at a point)  
 e  $a = 80$  (angles on a straight line),  $b = 65$   
 (vertically opposite angles),  $c = 115$  (angles on a  
 straight line)  
 f  $a = 45$  (angles on a straight line)  
 g  $p = 90$  (angles on a straight line)  
 h  $m = 30$  (angles on a straight line)
- 8 C

### Exercise 4.02

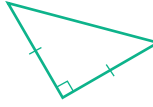
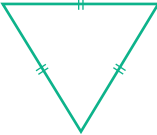
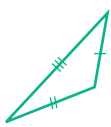
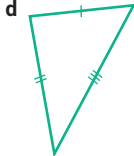
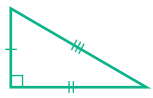
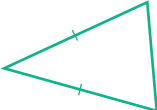
- 1 a alternate                      b co-interior  
 c corresponding                d co-interior  
 e alternate                      f co-interior
- 2 C
- 3 a  $e^\circ$                               b C                              c  $e^\circ$  or A or  $g^\circ$   
 d  $f^\circ$                               e D or  $h^\circ$  or  $f^\circ$  or B
- 4 a  $a = 70$  (alternate angles on parallel lines)  
 b  $d = 45$  (co-interior angles on parallel lines)  
 c  $a = 61$  (alternate angles on parallel lines)  
 d  $m = 120$  (corresponding angles on parallel lines)  
 e  $p = 89$  (co-interior angles on parallel lines)  
 f  $m = 112$  (co-interior angles on parallel lines)
- 5 (Other reasons possible)  
 a  $a = 61$  (alternate angles on parallel lines),  
 $b = 119$  (angles on a straight line)  
 b  $c = 70$  (co-interior angles on parallel lines),  
 $d = 70$  (vertically opposite angles)  
 c  $a = 65$  (co-interior angles on parallel lines),  
 $b = 115$  (alternate angles on parallel lines)  
 d  $g = 50$  (alternate angles on parallel lines),  
 $h = 60$  (alternate angles on parallel lines),  
 $m = 70$  (angles on a straight line)  
 e  $p = 100$  (angles on a straight line),  $q = 80$   
 (alternate angles on parallel lines)  
 f  $y = 89$  (vertically opposite angles and  
 corresponding angles on parallel lines)  
 g  $w = 108$  (co-interior angles on parallel lines),  
 $x = 108$  (angles on a straight line),  $y = 108$   
 (corresponding angles on parallel lines)  
 h  $a = 100$  (alternate angles on parallel lines  
 [by extending the middle parallel line])  
 i  $n = 250$  (co-interior angles on parallel lines)
- 6 D
- 7 a Yes (alternate angles are equal)  
 b Yes (corresponding angles are equal)  
 c No (co-interior angles do not add to  $180^\circ$ )  
 d Yes (co-interior angles add to  $180^\circ$ )
- 8 a 255                              b 52

### Exercise 4.03



- 2 a 2                              b 8                              c 1                              d 2
- 3 a Yes, 4                      b Yes, 5                      c Yes, 2                      d Yes, 8
- 4 a     
 b   
- 5, 6 Teacher to check.
- 7 a i 4                              ii yes, 4  
 b i 6                              ii yes, 6  
 c i 1                              ii no  
 d i 6                              ii yes, 6  
 e i 5                              ii yes, 5  
 f i 1                              ii no
- 8 a Circle                              b Circle

### Exercise 4.04

- 1 a scalene, obtuse-angled  
 b equilateral, acute-angled  
 c scalene, acute-angled  
 d isosceles, right-angled  
 e isosceles, obtuse-angled  
 f scalene, obtuse-angled  
 g scalene, right-angled  
 h isosceles, acute-angled  
 i isosceles, right-angled  
 j isosceles, obtuse-angled  
 k equilateral, acute-angled  
 l scalene, right-angled
- 2 a  b 
- c  d 
- e  f 

- 3 A  
 4 No, all angles are  $60^\circ$  in equilateral triangles so they are not obtuse.  
 5 a b, d, e, h, i, j, k      b b, k  
 6 a  $x = 42$  (angles in an isosceles triangle)  
 b  $y = 7$  (angles in an isosceles triangle)  
 c  $x = 60$  (angles in an equilateral triangle)  
 d  $l = 4.8$  (angles in an isosceles triangle)  
 e  $a = 17.2, b = 17.2$  (angles in an equilateral triangle)  
 f  $r = 15$  (angles in an isosceles triangle)  
 7 No, the sum of all angles cannot be greater than  $180^\circ$ .  
 8 C

Equilateral triangle	3	3
Isosceles triangle	1	No rotational symmetry
Scalene triangle	0	No rotational symmetry

### Mental skills 4A

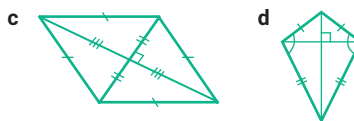
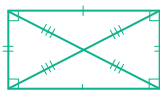
- 2 a 70%      b 66%      c 45%      d 88%  
 e 75%      f 75%      g 80%      h 80%  
 i 55%      j 35%      k 30%      l 80%  
 m 90%      n 45%      o 52%  
 4 a 25%      b 68%      c 17%      d 60%  
 e 10%      f 33.3%      g 59%      h 70.2%  
 i 84%      j 70%      k 42.8%      l 5.5%  
 m 91%      n 78.25%      o 31.4%

### Exercise 4.05

- 1 a convex      b convex      c non-convex  
 d non-convex      e convex      f convex  
 2 a square      b trapezium      c kite  
 d parallelogram  
 3 a square, rectangle      b trapezium  
 c square, rhombus  
 d parallelogram, rectangle, square, rhombus  
 e parallelogram, rectangle, square, rhombus  
 f kite, square, rhombus  
 4 rhombus

Quadrilateral	Number of axes of symmetry	Order of rotational symmetry
Rectangle	2	2
Parallelogram	0	2
Trapezium	0	No rotational symmetry
Rhombus	2	2
Square	4	4
Kite	1	No rotational symmetry

- 6 a trapezium      b rhombus  
 7 B  
 8 a



- 9 a False      b True      c True      d True  
 e False      f True      g False

### Exercise 4.06

- 1 a parallel  
 b equal; angles; right angles  
 c opposite; sides; equal; bisect  
 d sides; opposite; parallel; opposite; equal; right; bisect  
 e equal; parallel; right angles; equal; bisect  
 f equal; right angles; sides; equal; right angles  
 2 a Parallelogram, rectangle, rhombus, square  
 b Square, rhombus, kite  
 c Parallelogram, rectangle, rhombus, square  
 d Trapezium  
 e Parallelogram, rectangle, rhombus, square  
 f Parallelogram, rectangle, rhombus, square  
 g Parallelogram, rectangle, trapezium, kite  
 h Rectangle, square  
 i Rectangle, square  
 j Rhombus, square  
 3 a  $a + 70 = 180$  (co-interior angles on parallel lines);  $a = 110, b = 70$  (opposite angles of a parallelogram)  
 4 a  $m = 123$  (opposite angles of a parallelogram)  
 b  $a = 154$  (co-interior angles on parallel lines),  $b = 26$  (opposite angles of a rhombus or co-interior angles on parallel lines)  
 c  $x = 156$  (co-interior angles on parallel lines),  $y = 156$  (opposite angles of a parallelogram and vertically opposite angles, or co-interior angles on parallel lines and vertically opposite angle)  
 d  $l = 45$  (diagonals bisect the angles of a square)  
 e  $a = 49$  (angle sum of a triangle),  $b = 90$  (diagonals of a rhombus bisect each other at right angles)  
 f  $x = 87$  (corresponding angles on parallel lines),  $y = 93$  (co-interior angles on parallel lines)  
 g  $m = 75$  (co-interior angles on parallel lines),  $n = 75$  (equal angles of an isosceles trapezium, or by symmetry)  
 h  $a = 147$  (co-interior angles on parallel lines),  $b = 33$  (opposite angles of a parallelogram or co-interior angles on parallel lines)  
 i  $a = 5, b = 7$  (opposite sides of a parallelogram)  
 j  $a = 4, c = 7$  (diagonals of a parallelogram bisect each other)  
 k  $a = 70, b = 92$  (co-interior angles on parallel lines)  
 5 B      6 D      7 A      8 A  
 9 a No, teacher to check      b No, teacher to check  
 c Yes, teacher to check

### Exercise 4.07

- 1 a  $a = 45$     b  $b = 60$     c  $c = 50$   
 d  $d = 60$     e  $e = 18$     f  $f = 33$   
 g  $g = 120$     h  $h = 80$     i  $i = 45$
- 2 a  $a = 127$     b  $b = 140$     c  $c = 60$   
 d  $d = 28$     e  $e = 100$     f  $f = 120$   
 g  $g = 50$     h  $h = 136$     i  $i = 120$
- 3 a  $a = 89$     b  $b = 62$     c  $c = 109$   
 d  $d = 90$     e  $e = 33$     f  $f = 245$   
 g  $g = 90$     h  $h = 90$     i  $i = 140$
- 4 C            5 A            6 A            7 C
- 8  $x = 68$  (angle sum of an isosceles triangle),  
 $y = 34$  (exterior angle of an isosceles triangle)

### Exercise 4.08

- 1 a hexagon, irregular, convex  
 b quadrilateral, irregular, convex  
 c pentagon, irregular, non-convex  
 d triangle, irregular, convex  
 e decagon, regular, convex  
 f heptagon, irregular, convex  
 g octagon, regular, convex  
 h nonagon, irregular, non-convex

2

Polygon	Number of sides	Sum of angles inside polygon
hexagon	6	$720^\circ$
heptagon	7	$900^\circ$
octagon	8	$1080^\circ$
nonagon	9	$1260^\circ$
decagon	10	$1440^\circ$

- 3 a  $2340^\circ$     b  $3240^\circ$     c  $4140^\circ$     d  $17\,640^\circ$
- 4 a  $a = 95$     b  $b = 110$     c  $d = 108$     d  $c = 160$   
 e  $g = 140$     f  $x = 90$     g  $e = 135$
- 5 a  $90^\circ$     b  $60^\circ$     c  $120^\circ$     d  $135^\circ$   
 e  $144^\circ$     f  $108^\circ$     g  $150^\circ$
- 6 a 14    b 34    c 26    d 53    e 125
- 7 a Yes, 10                      b No

### Mental skills 4B

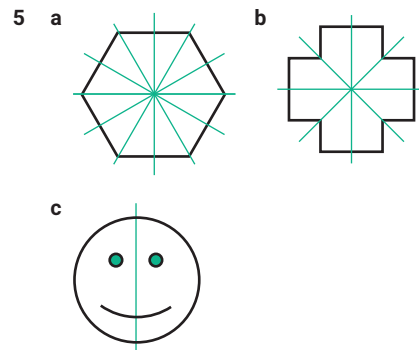
- 2 a  $\frac{3}{4}$     b  $\frac{7}{25}$     c  $\frac{3}{10}$     d  $\frac{7}{50}$     e  $\frac{3}{50}$   
 f  $\frac{17}{20}$     g  $\frac{8}{25}$     h  $\frac{49}{100}$     i  $\frac{14}{25}$     j  $\frac{9}{10}$   
 k  $\frac{18}{25}$     l  $\frac{13}{20}$     m  $\frac{1}{5}$     n  $\frac{6}{25}$     o  $\frac{53}{100}$
- 4 a  $\frac{19}{25}$     b  $\frac{1}{10}$     c  $\frac{4}{5}$     d  $\frac{9}{20}$     e  $\frac{22}{25}$   
 f  $\frac{14}{25}$     g  $\frac{3}{4}$     h  $\frac{31}{100}$     i  $\frac{17}{25}$     j  $\frac{1}{20}$   
 k  $\frac{3}{5}$     l  $\frac{27}{50}$     m  $\frac{3}{50}$     n  $\frac{49}{100}$     o  $\frac{41}{50}$

### Power plus

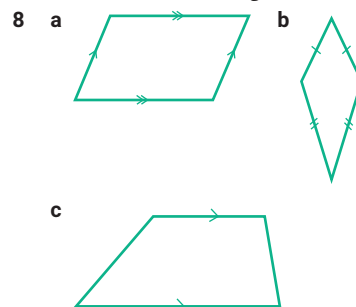
- 1 a  $x = 121$     b  $x = 88$     c  $x = 96$   
 d  $x = 110$     e  $x = 6$     f  $x = 34$   
 g  $x = 67$     h  $x = 155$     i  $x = 117$   
 j  $x = 108$     k  $x = 30$     l  $x = 140$

### Test yourself 4

- 1 a obtuse    b acute    c reflex
- 2 a  $x = 50$  (angles on a straight line)  
 b  $a = 50$  (angles on a straight line),  $b = 130$  (vertically opposite angles or angles on a straight line)  
 c  $y = 5$  (angles in a right angle)  
 d  $n = 72$  (vertically opposite angles)  
 e  $w = 130$  (angles at a point)
- 3 a corresponding    b alternate  
 c co-interior
- 4 a  $m = 100$  (alternate angles on parallel lines)  
 b  $x = 95$  (co-interior angles on parallel lines)  
 c  $x = 80$  (straight angle on parallel lines);  $y = 80$  (corresponding angles on parallel lines)  
 d  $m = 88$  (alternate angles on parallel lines);  
 $p = 88$  (corresponding angles on parallel lines)



- 6 a yes, 6    b yes, 4    c no
- 7 a scalene, right-angled    b scalene, obtuse-angled  
 c isosceles, obtuse-angled  
 d equilateral, acute-angled  
 e isosceles, acute-angled  
 f isosceles, acute-angled  
 g isosceles, right-angled  
 h scalene, obtuse-angled  
 i isosceles, obtuse-angled



- 9 a rhombus, square      b kite  
c rectangle, square  
d parallelogram, rhombus, rectangle, square  
e parallelogram, rhombus, rectangle, square
- 10 a  $a = 50$       b  $a = 42$       c  $y = 30$   
d  $y = 53$       e  $x = 34$       f  $m = 106$
- 11 a  $m = 63$       b  $x = 135$       c  $y = 123$   
d  $d = 70$       e  $a = b = 115$       f  $a = 56, b = 68$   
g  $a = 48, b = 66$
- 12 a  $x = 42$       b  $m = 66$       c  $y = 130$
- 13 A

## Chapter 5

### SkillCheck

- 1 a 200      b 3.5      c 2.5  
d 4.6      e 4000      f 5.2  
g 0.6      h 8.2      i 400
- 2 a 12 cm      b 19.2 m      c 86 m  
d 112 mm      e 21 cm      f 13 cm
- 3 a  $4 \text{ m}^2$       b  $30 \text{ cm}^2$       c  $56 \text{ m}^2$   
d  $91.84 \text{ cm}^2$       e  $58 \text{ mm}^2$       f  $140 \text{ m}^2$

### Exercise 5.01

- 1 a 84 mm      b 33.2 cm      c 69.3 mm  
d 158 cm      e 43.3 m      f 12.4 km
- 2 a 31.5 m      b 34 m      c 45 cm  
d 60 km      e 66 cm      f 64 m  
g 164 mm      h 58 cm      i 92 m
- 3 a 12 cm      b 34 m  
c 15 cm      d 22 m
- 4 C      5 D
- 6 a 56 mm      b 84 mm  
c 92 mm      d 80 mm
- 7 A      8 7 m      9 4.5 m
- 10 4 cm      11 16 cm
- 12 18 cm      13 36 m

### Exercise 5.02

- 1 a  $\text{m}^2$       b  $\text{cm}^2$       c  $\text{m}^2$   
d  $\text{km}^2$       e  $\text{cm}^2$       f  $\text{cm}^2$
- 2 A
- 3 a 1      b 7.5      c 0.45  
d 0.034      e 0.06      f 43.2  
g 0.000 95      h 0.76      i 0.048  
j 300 000      k 85 000      l 6 900 000  
m 5400      n 7 000 000      o 4800  
p 450 000
- 4 D      5  $0.0025 \text{ km}^2$
- 6  $3\ 002\ 800 \text{ ha}$       7  $1348.05 \text{ km}^2$
- 8 a  $0.875 \text{ km}^2$       b  $87.5 \text{ ha}$
- 9 a 0.0076      b 70 000 000      c 8 000 000  
d 8.5      e 69 000      f 152 000  
g 0.85      h 49

- 10 32.9%
- 11 a  $8.81 \text{ km}^2$       b 6.2

### Exercise 5.03

- 1 a  $24 \text{ m}^2$       b  $36 \text{ cm}^2$       c  $48 \text{ cm}^2$   
d  $3 \text{ cm}^2$       e  $53.3 \text{ mm}^2$       f  $37.21 \text{ m}^2$   
g  $54.4 \text{ cm}^2$       h  $85.56 \text{ km}^2$       i  $340 \text{ mm}^2$   
j  $6 \text{ m}^2$       k  $84 \text{ cm}^2$       l  $136 \text{ m}^2$
- 2 a  $10\ 800 \text{ cm}^2$       b  $42\ 140 \text{ mm}^2$       c  $547\ 200 \text{ m}^2$   
d  $552 \text{ mm}^2$       e  $243.6 \text{ mm}^2$       f  $528\ 000 \text{ m}^2$
- 3 D      4 C      5 5 cm      6 3 m
- 7 7 cm      8 Teacher to check.      9 60 m
- 10 a  $15.6 \text{ cm}^2$       b  $66.4 \text{ mm}^2$       c  $8.4 \text{ m}^2$       d  $30 \text{ km}^2$

### Exercise 5.04

- 1 A
- 2 a  $150 \text{ m}^2$       b  $51 \text{ m}^2$       c  $88 \text{ mm}^2$   
d  $156 \text{ m}^2$       e  $950 \text{ mm}^2$       f  $36 \text{ cm}^2$   
g  $189 \text{ m}^2$       h  $154 \text{ cm}^2$       i  $71 \text{ m}^2$   
j  $201.19 \text{ km}^2$       k  $88\ 000 \text{ cm}^2$       l  $280 \text{ mm}^2$   
m  $20 \text{ m}^2$
- 3 C      4 B      5  $1874 \text{ cm}^2$

### Mental skills 5A

- 2 a 0.7      b 0.6      c 0.07  
d 0.45      e 0.98      f 0.4
- 4 a 0.61      b 0.04      c 0.9  
d 0.38      e 0.271      f 0.007

### Exercise 5.05

- 1 a  $148 \text{ mm}^2$       b  $1080 \text{ m}^2$       c  $97.6 \text{ m}^2$   
d  $33.02 \text{ mm}^2$       e  $472 \text{ cm}^2$       f  $30 \text{ cm}^2$   
g  $862.5 \text{ mm}^2$       h  $162 \text{ cm}^2$       i  $680 \text{ cm}^2$
- 2 a  $8200 \text{ m}^2$       b  $6560 \text{ m}^2$
- 3  $630\ 000 \text{ mm}^2$       4 D
- 5 a  $546 \text{ cm}^2$       b  $1772 \text{ cm}^2$
- 6 D      7 4 m

### Exercise 5.06

- 1 a  $1.5 \text{ cm}^2$       b  $850 \text{ mm}^2$       c  $8.16 \text{ m}^2$       d  $210 \text{ cm}^2$
- 2 a  $240 \text{ m}^2$       b  $80 \text{ cm}^2$       c  $315 \text{ mm}^2$   
d  $1344 \text{ m}^2$       e  $1.8 \text{ m}^2$
- 3 B
- 4 a  $300 \text{ mm}^2$       b  $172.5 \text{ mm}^2$       c  $90 \text{ mm}^2$   
d  $360 \text{ mm}^2$       e  $120 \text{ mm}^2$       f  $72 \text{ mm}^2$   
g  $66.5 \text{ mm}^2$       h  $510 \text{ mm}^2$       i  $112 \text{ mm}^2$
- 5 a 10 cm and 6 cm      b  $30 \text{ cm}^2$   
c  $90 \text{ cm}^2$

### Exercise 5.07

- 1 Teacher to check.
- 2 a diameter      b segment      c sector  
d arc      e radius      f chord  
g circumference      h tangent

- 3 a radius      b quadrant      c tangent  
 d diameter      e chord      f arc  
 g sector      h circumference      i segment

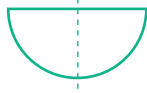
4 B      5 B

6 Teacher to check.

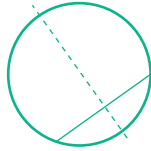
- 7 a i 1      ii no rotational symmetry



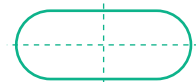
- b i 1      ii no rotational symmetry



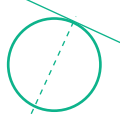
- c i 1      ii no rotational symmetry



- d i 2      ii 2



- e i 1      ii no rotational symmetry



- f i 1      ii no rotational symmetry



8 Teacher to check.

### Exercise 5.08

- 1 a 12 cm      b 24 m      c 9 cm      d 18 cm  
 2 a 12.57 cm      b 25.13 m  
 c 9.42 cm      d 18.85 cm  
 3 a  $4\pi$  cm      b  $8\pi$  m      c  $3\pi$  cm      d  $6\pi$  cm  
 4 a 36 m      b 60 mm      c 42 cm      d 12 mm  
 5 a 37.7 m      b 62.8 mm      c 44.0 cm      d 12.6 mm  
 6 a  $12\pi$  m      b  $20\pi$  mm      c  $14\pi$  cm      d  $4\pi$  mm  
 7 4.40 m  
 8 a 188.5 cm      b 477  
 9 40 023.9 km      10 100.5 mm      11 236 mm  
 12 a 6.28 cm      b 21.99 cm  
 c 18.85 cm      d 31.42 cm  
 13 C      14 D  
 15 a 210.5 m      b  $(154 + 18\pi)$  m  
 16 16 cm      17 Ali, 25 m

### Mental skills 5B

- 2 a  $\frac{3}{5}$       b  $\frac{1}{4}$       c 0.105  
 d 3.68      e  $\frac{4}{10}$       f  $\frac{5}{6}$   
 g 2.817      h 0.503      i  $\frac{1}{5}$   
 3 a 0.082, 0.81, 0.821      b 3.5, 3.51, 3.513, 3.55  
 c  $\frac{1}{6}, \frac{2}{5}, \frac{2}{3}$       d 0.007, 0.07, 0.7, 0.707  
 e  $\frac{2}{10}, \frac{3}{8}, \frac{1}{2}$       f  $\frac{1}{4}, \frac{4}{10}, \frac{3}{5}$   
 5 a  $0.25, \frac{1}{5}, \frac{1}{6}, 16\%$       b  $0.4, \frac{1}{3}, 0.28, 27\%$   
 c  $50\%, \frac{1}{8}, 6\%, 0.05$       d  $\frac{3}{4}, 0.639, 55\%, \frac{2}{5}$   
 e  $69\%, \frac{2}{3}, 0.609, 0.6$       f  $22.5\%, \frac{2}{9}, 17\%, 0.105$

### Exercise 5.09

- 1 a 28.3 cm<sup>2</sup>      b 452.4 mm<sup>2</sup>      c 0.2 m<sup>2</sup>  
 d 19.6 cm<sup>2</sup>      e 3421.2 mm<sup>2</sup>  
 2 a  $9\pi$  cm<sup>2</sup>      b  $144\pi$  mm<sup>2</sup>      c  $0.0625\pi$  m<sup>2</sup>  
 d  $6.25\pi$  cm<sup>2</sup>      e  $1089\pi$  mm<sup>2</sup>  
 3 a 13.85 cm<sup>2</sup>      b 38.48 cm<sup>2</sup>      c 78.54 cm<sup>2</sup>  
 4 a  $4.41\pi$  cm<sup>2</sup>      b  $12.25\pi$  cm<sup>2</sup>      c  $25\pi$  cm<sup>2</sup>  
 5 539 m<sup>2</sup>      6 3690.67 cm<sup>2</sup>      7  $196\pi$  cm<sup>2</sup>  
 8 D      9 6.2 m<sup>2</sup>      10 12.03 cm  
 11 A      12 A  
 13 a 160.97 cm<sup>2</sup>      b 221.54 m<sup>2</sup>      c 85.81 mm<sup>2</sup>  
 d 46.27 cm<sup>2</sup>      e 21.46 cm<sup>2</sup>      f 16.08 cm<sup>2</sup>  
 14 a i 153.9 m<sup>2</sup>      ii 95.0 m<sup>2</sup>      iii 58.9 m<sup>2</sup>  
 b i 314.2 m<sup>2</sup>      ii 254.5 m<sup>2</sup>      iii 59.7 m<sup>2</sup>  
 15 a 9168 m<sup>2</sup>      b 7326 m<sup>2</sup>  
 c 1842 m<sup>2</sup>      d \$44 668.50

### Exercise 5.10

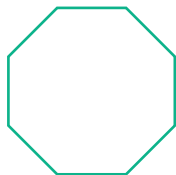
- 1 a  $\frac{1}{2}$       b  $\frac{1}{6}$       c  $\frac{1}{3}$       d  $\frac{13}{18}$   
 2 a 50.0 mm      b 37.5 cm      c 137.1 cm  
 d 12.2 m  
 3 D  
 4 a 153.94 mm<sup>2</sup>      b 87.27 cm<sup>2</sup>  
 c 1073.24 cm<sup>2</sup>      d 6.87 m<sup>2</sup>  
 5 a  $P = 14.3$  cm,  $A = 12.6$  cm<sup>2</sup>  
 b  $P = 128.5$  mm,  $A = 981.7$  mm<sup>2</sup>  
 c  $P = 9.3$  cm,  $A = 5.3$  cm<sup>2</sup>  
 d  $P = 18.0$  cm,  $A = 19.2$  cm<sup>2</sup>  
 e  $P = 61.4$  mm,  $A = 235.6$  mm<sup>2</sup>  
 f  $P = 2.0$  m,  $A = 0.2$  m<sup>2</sup>  
 g  $P = 106.7$  mm,  $A = 641.4$  mm<sup>2</sup>  
 h  $P = 82.6$  m,  $A = 351.9$  m<sup>2</sup>  
 i  $P = 177.7$  mm,  $A = 1954.8$  mm<sup>2</sup>  
 6 D  
 7 a 6°      b 10.26 cm<sup>2</sup>  
 8 9.62 cm<sup>2</sup>

### Exercise 5.11

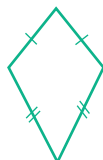
- 1 a  $m^3$       b  $cm^3$       c  $cm^3$   
 d  $m^3$       e  $cm^3$       f  $m^3$
- 2 C
- 3 a 5 000 000      b 1 600 000      c 2000  
 d 4 000 000 000      e 0.006      f 8 200 000  
 g 7 000 000      h 0.0096      i 4  
 j 0.16      k 0.25      l 12 000  
 m 180 000      n 0.2
- 4 0.272  $m^3$       5 D      6 A
- 7 a E      b G      c F  
 d C      e A      f B  
 g D
- 8 2 460 000  $mm^3$

### Exercise 5.12

- 1 a Yes      b No      c No  
 d Yes      e No      f Yes
- 2 a i      ii octagonal prism



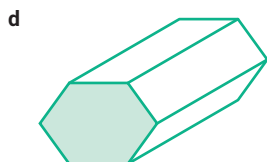
- b i      ii kite prism



- c i      ii pentagonal prism



- 3 a      b
- 



- 4 a 210.8  $m^3$       b 4.096 875  $m^3$       c 486.42  $cm^3$   
 5 a 135  $cm^3$       b 64  $m^3$       c 6120  $mm^3$   
 d 1.728  $m^3$       e 21 952  $mm^3$       f 258.06  $cm^3$   
 6 a 90  $cm^3$       b 15 400  $mm^3$       c 7.8125  $m^3$

- 7 B
- 8 a 22 500  $mm^3$       b 928  $cm^3$   
 c 13 200  $cm^3$       d 288  $cm^3$
- 9 a 0.306  $m^3$       b 0.306  $m^3$  Teacher to check.
- 10 A      11 5 m      12 7 m
- 13 a 220  $cm^3$       b 11 220  $mm^3$       c 24 000  $m^3$   
 d 29 450  $mm^3$       e 82  $m^3$
- 14 B      15 Teacher to check.

### Exercise 5.13

- 1 a 153.93  $m^2$       b 1847.26  $m^3$
- 2 C
- 3 a 1133.0  $cm^3$       b 17 671.5  $mm^3$       c 1.8  $m^3$   
 d 1606.0  $cm^3$       e 17 583.1  $cm^3$   
 f 301 592.9  $mm^3$       g 499.6  $m^3$
- 4 a 4.25 cm      b 4.75 cm      c 678.58  $cm^3$
- 5 B      6 8 cm
- 7 a 4021.2  $m^3$       b 732 944.7  $m^3$   
 c 1005.3  $mm^3$       d 786.1  $m^3$   
 e 380.8  $m^3$       f 3 685 088.2  $mm^3$
- 8 4 m

### Exercise 5.14

- 1 a mL      b ML      c L  
 d mL      e L      f kL
- 2 a 5      b 3400      c 1600  
 d 4      e 2.98      f 7 100 000  
 g 0.875      h 8200      i 800  
 j 1.85      k 5400      l 900  
 m 6000      n 3.5      o 1 200 000
- 3 A      4 A
- 5 a 121 500  $cm^3$       b 121.5 L
- 6 424 mL      7 1 800 000 L
- 8 a 70 200 000  $cm^3$       b 70 200 L
- 9 a 23.4 L      b 10
- 10 Teacher to check.      11 1728 L
- 12 a 1.32  $m^3$       b 1320 L
- 13 a 18.850  $m^3$       b 18 849.6 L
- 14 a 0.72 L      b 17.28 L
- 15 Teacher to check.

### Power plus

- 1 a 35.4 cm      b 1228.3 mm      c 57.1 cm
- 2 a 7.9  $m^2$       b 14.4 m
- 3 a 2.09  $cm^2$       b Teacher to check  
 c 1.73  $cm^2$       d 0.36  $cm^2$       e 2.81  $m^2$
- 4 a 4.4  $m^2$       b 47.1  $cm^2$       c 39.3  $m^2$

### Test yourself 5

- 1 C
- 2 a 76 mm      b 256 cm      c 31.4 km
- 3 a 2      b 70 000      c 0.8  
 d 30 000 000      e 7      f 7.7  
 g 0.0007      h 72 000      i 0.058
- 4 B

- 5 a  $56.7 \text{ m}^2$     b  $51.6 \text{ mm}^2$     c  $345 \text{ cm}^2$   
 d  $49 \text{ km}^2$     e  $69.3 \text{ m}^2$     f  $775.5 \text{ cm}^2$
- 6 a  $450 \text{ mm}^2$     b  $133 \text{ cm}^2$   
 c  $6.3 \text{ m}^2$     d  $86 \text{ cm}^2$
- 7 a  $288.51 \text{ mm}^2$     b  $17.16 \text{ m}^2$     c  $4126.5 \text{ cm}^2$
- 8 a  $189 \text{ m}^2$     b  $1560 \text{ mm}^2$     c  $418 \text{ cm}^2$
- 9 a segment    b radius    c arc  
 d centre    e diameter    f chord  
 g sector    h tangent
- 10 a i 1    ii no rotational symmetry  
 b i 2    ii 2  
 c i 1    ii no rotational symmetry  
 d i 1    ii no rotational symmetry
- 11 a  $12.6 \text{ cm}$     b  $62.8 \text{ mm}$     c  $44.0 \text{ cm}$     d  $88.0 \text{ cm}$
- 12 a i  $4\pi \text{ cm}^2$     ii  $12.6 \text{ cm}^2$   
 b i  $100\pi \text{ mm}^2$     ii  $314.2 \text{ mm}^2$   
 c i  $49\pi \text{ cm}^2$     ii  $153.9 \text{ cm}^2$   
 d i  $196\pi \text{ mm}^2$     ii  $615.8 \text{ mm}^2$
- 13 a  $20.38 \text{ cm}$     b  $40.85 \text{ cm}$   
 c  $26.85 \text{ cm}$     d  $56.55 \text{ cm}$
- 14 a  $25.13 \text{ cm}^2$     b  $116.55 \text{ cm}^2$   
 c  $37.70 \text{ cm}^2$     d  $208.23 \text{ cm}^2$
- 15 a 8 200 000    b 3400    c 2  
 d 1000000000    e 8 000000000    f 45
- 16 a  $391.392 \text{ cm}^3$     b  $2200 \text{ mm}^3$     c  $672 \text{ m}^3$   
 d  $35\,200 \text{ mm}^3$     e  $25\,350 \text{ cm}^3$
- 17 a  $452.39 \text{ mm}^3$     b  $543.43 \text{ m}^3$     c  $154\,893.81 \text{ cm}^3$
- 18 a 3000    b 2.5    c 6500  
 d 0.0072    e 0.12    f 0.035
- 19 a 5.7 L    b 4000 L    c 2.5 L
- 20 a  $8.75 \text{ m}^2$     b  $35 \text{ m}^3$     c  $35\,000 \text{ L}$

## Chapter 6

### SkillCheck

- 1 a 3    b 8    c 20    d 4  
 e 6    f 3    g 40    h 15
- 2 a  $\frac{17}{100}$     b  $\frac{3}{100}$     c  $\frac{51}{100}$   
 d  $\frac{63}{100}$     e  $\frac{89}{100}$
- 3 a 70%    b 5%    c 61%  
 d 29%    e 88%    f 93%
- 4 a 13%    b 73%    c 8%
- 5 a 87%    b 27%    c 92%
- 6 65%
- 7 1, 2, 4, 5, 10, 20, 25, 50, 100
- 8 a \$40    b 6 kg    c \$5  
 d 10 kg    e \$3    f 2 kg

### Exercise 6.01

- 1 a  $1\frac{1}{2}$     b  $3\frac{2}{3}$     c  $2\frac{1}{4}$   
 d  $2\frac{2}{5}$     e 5    f  $4\frac{3}{11}$

- 2 a  $\frac{7}{2}$     b  $\frac{13}{3}$     c  $\frac{23}{4}$     d  $\frac{23}{3}$   
 e  $\frac{39}{5}$     f  $\frac{65}{9}$     g  $\frac{71}{7}$     h  $\frac{93}{10}$

3 Teacher to check.

4 Mixed numeral, because it is greater than 1, while a proper fraction is less than 1.

- 5 a  $\frac{1}{2}$     b  $\frac{3}{4}$     c  $\frac{3}{8}$     d  $2\frac{7}{10}$   
 e  $\frac{11}{15}$     f  $\frac{5}{12}$

- 6 a  $\frac{1}{2}$     b  $\frac{1}{3}$     c  $\frac{6}{13}$     d  $\frac{3}{4}$   
 e  $\frac{3}{5}$     f  $\frac{4}{7}$     g  $\frac{2}{3}$     h  $\frac{3}{5}$   
 i  $\frac{4}{7}$     j  $\frac{4}{7}$     k  $\frac{3}{5}$     l  $\frac{9}{10}$

7 A

- 8 a  $1\frac{1}{2}$     b 3    c  $4\frac{1}{2}$     d  $1\frac{4}{5}$

### Exercise 6.02

- 1 a  $\frac{4}{5}$     b  $\frac{1}{2}$     c  $\frac{5}{8}$     d  $1\frac{3}{8}$   
 2 a  $\frac{7}{10}$     b  $\frac{5}{21}$     c  $\frac{17}{20}$     d  $\frac{1}{4}$   
 e  $\frac{13}{24}$     f  $\frac{1}{30}$     g  $1\frac{5}{18}$     h  $\frac{11}{24}$   
 i  $1\frac{1}{8}$     j  $\frac{1}{7}$     k  $3\frac{5}{9}$     l  $2\frac{3}{5}$

3  $\frac{17}{40}$     4 D

5 a  $\frac{5}{12}$     b  $\frac{17}{30}$

6  $\frac{1}{2}$     7 C

8 A

- 9 a  $1\frac{9}{10}$     b  $3\frac{5}{8}$     c  $16\frac{17}{24}$     d  $5\frac{1}{45}$   
 e  $1\frac{21}{40}$     f  $1\frac{19}{20}$     g  $\frac{5}{6}$     h  $1\frac{7}{10}$

10 a  $2, 2\frac{1}{2}, 3\frac{1}{2}, 1$     b  $1, \frac{5}{6}, 1\frac{1}{3}, 0, \frac{1}{2}$

### Exercise 6.03

- 1 a  $\frac{1}{3}$     b  $\frac{10}{21}$     c  $\frac{1}{64}$     d  $\frac{3}{4}$   
 e  $\frac{9}{20}$     f  $4\frac{1}{2}$     g  $12\frac{7}{20}$     h  $3\frac{1}{9}$

2 D

- 3 a  $\frac{3}{14}$     b  $\frac{8}{15}$     c  $\frac{2}{3}$     d  $1\frac{1}{2}$   
 e 16    f 9    g  $\frac{1}{8}$     h  $\frac{1}{15}$

i  $3\frac{1}{2}$     j  $3\frac{2}{11}$     k  $2\frac{4}{5}$     l  $3\frac{9}{22}$

4  $\frac{3}{32}$

5 a 1 (or -1)    b 0    c 1    d  $\frac{1}{3}$

6 a  $\frac{7}{8}$     b  $\frac{2}{3}$     c  $\frac{2}{21}$     d  $\frac{7}{10}$

- 7 a Increase: dividing by a proper fraction is the same as multiplying by its reciprocal, an improper fraction, whose value is greater than 1, so the number will increase.  
 b Increase: multiplying by an improper fraction, whose value is greater than 1, will make the number increase.

### Exercise 6.04

- 1 a  $\frac{3}{5}$       b  $\frac{3}{4}$       c  $\frac{31}{100}$       d  $\frac{2}{25}$   
 e  $\frac{3}{10}$       f  $\frac{17}{20}$       g  $\frac{99}{100}$       h  $\frac{3}{100}$   
 i  $1\frac{3}{5}$       j  $1\frac{7}{20}$       k  $\frac{1}{4}$       l  $2\frac{1}{2}$
- 2 C
- 3 a 0.18      b 0.82      c 0.02      d 0.5  
 e 1.2      f 0.511      g 0.79      h 0.125  
 i 0.163      j 0.04      k 0.187      l 0.0525
- 4 a 17%      b 70%      c 26%  
 d 55%      e 62.5%      f 96%  
 g  $66\frac{2}{3}\%$       h 125%      i 140%  
 j 67.5%      k 6.25%      l  $44\frac{4}{9}\%$
- 5 a 38%      b 55%      c 96%      d 62.5%  
 e 8%      f 5.4%      g 60%      h 0.3%  
 i 190%      j 40.5%      k 126%      l 11.4%
- 6 a  $\frac{13}{20}$ , 65%      b  $\frac{3}{5}$ , 60%      c  $\frac{1}{5}$ , 0.2  
 d  $\frac{21}{25}$ , 0.84      e \$0.5, 50%      f 0.125, 12.5%  
 g  $\frac{9}{25}$ , 0.36      h 0.625, 62.5%      i  $\frac{73}{100}$ , 73%  
 j 0.3,  $33\frac{1}{3}\%$       k  $\frac{2}{3}$ , 0.6
- 7 a 75%      b  $\frac{4}{25}$       c  $\frac{2}{3}$   
 d 18%      e  $\frac{1}{4}$       f 55%  
 g  $\frac{19}{20}$       h 60%      i  $\frac{1}{6}$
- 8 a 0.75, 78%,  $\frac{4}{5}$ ,  $\frac{9}{11}$       b 22%,  $\frac{1}{4}$ , 0.29,  $\frac{7}{20}$ .  
 c 57%,  $\frac{3}{5}$ , 0.605, 0.62
- 9 C
- 10 a 0.47,  $\frac{9}{20}$ , 43%,  $\frac{2}{5}$       b 0.88, 86%,  $\frac{21}{25}$ , 0.08  
 c  $\frac{19}{20}$ , 91%, 0.905,  $\frac{9}{10}$

### Mental skills 6A

- 2 a 19      b \$7.50      c 87.5      d \$20.20  
 e \$3.76      f 40      g \$0.925      h 89.6  
 i \$270      j \$0.38      k \$152.76      l \$7.25  
 m 315.4      n \$1.07      o 42.6      p \$2431.76
- 4 a 10      b 124      c \$490      d \$1.72  
 e 14.4      f \$2540      g 78      h \$1.16  
 i \$9      j \$16.80      k \$920      l 64
- 6 a 100      b \$0.60      c 2.5      d \$1.35  
 e \$1.84      f \$4.20      g 40      h 6.5  
 i \$0.48      j \$6.90      k \$3.60      l 42

### Exercise 6.05

- 1 a 24      b 7      c 4  
 d 10      e 42      f 10  
 g 750 m      h 8 h      i 400 mL  
 j 125 kg      k 10 months      l 35 min
- 2 C
- 3 a \$55      b 5 kg      c 19.5 L  
 d 126 cm      e \$67.50      f 285 g  
 g 473.76 m      h 286.72 km      i 152.29 mL  
 j \$15.62      k \$89.68      l 45.539 kg  
 m 104.5      n 453      o \$2613  
 p 126 m      q 595 g      r \$460
- 4 0.675 kg
- 5 a \$105      b \$315
- 6 234
- 7 a 96 cm      b 350 kg  
 c 144 min      d 75 mL  
 e 11 250 g      f 900 m  
 g 84 h      h 30 min  
 i 27 000 mg
- 8 63      9 \$0.86      10 273
- 11 D
- 12 17      13 24 318      14 1400
- 15 a \$90      b \$500

### Exercise 6.06

- 1 a  $\frac{1}{2}$       b  $\frac{19}{25}$       c  $\frac{87}{100}$   
 d  $\frac{2}{3}$       e  $\frac{1}{4}$       f  $\frac{3}{8}$
- 2 a 50%      b 76%      c 87%  
 d  $66\frac{2}{3}\%$       e 25%      f  $37\frac{1}{2}\%$
- 3 62.5%
- 4 a  $\frac{2}{5}$       b 36%
- 5 No
- 6 a  $\frac{172}{189}$       b 9%
- 7 a 32%      b  $\frac{9}{67}$       c 13.4%
- 8 5%
- 9 a i \$169      ii \$205      iii \$249  
 b i 11.8%      ii 12.7%      iii 12.0%  
 c ii \$179 oven
- 10 A
- 11 a  $\frac{1}{12}$       b  $\frac{1}{4}$       c  $\frac{7}{10}$       d  $\frac{23}{100}$   
 e  $\frac{1}{8}$       f  $\frac{1}{6}$       g  $\frac{3}{20}$       h  $\frac{19}{70}$   
 i  $\frac{1}{8}$       j  $\frac{3}{8}$       k  $\frac{8}{15}$       l  $\frac{4}{35}$
- 12 a  $8\frac{1}{3}\%$       b 25%      c 70%      d 23%  
 e  $12\frac{1}{2}\%$       f  $16\frac{2}{3}\%$       g 15%      h  $27\frac{1}{7}\%$   
 i  $12\frac{1}{2}\%$       j  $37\frac{1}{2}\%$       k  $53\frac{1}{3}\%$       l  $11\frac{3}{7}$
- 13 C

- 14 a** Broncos 124.9%, Bulldogs 112.0%, Cowboys 84.7%, Dragons 81.3%, Eels 115.6%, Knights 86.9%, Panthers 76.1%, Rabbitohs 97.2%, Raiders 86.9%, Roosters 61.8%, Sea Eagles 184.7%, Sharks 117.6%, Storm 230.9%, Tigers 77.6%, Titans 79.9%, Warriors 151.5%
- b** Storm, Sea Eagles, Warriors, Broncos

### Exercise 6.07

- 1 a** \$157.50      **b** 480      **c** 73.2 km  
**d** \$2650      **e** 152 kg      **f** 13.3 L
- 2 a** \$176      **b** 102      **c** 101.2 kg  
**d** \$243.75      **e** 1240 L      **f** \$1522.90
- 3** \$232.20
- 4 a** \$405      **b** \$3105
- 5** \$1024.10      **6** 171.36 cm      **7** D
- 8** \$18 691.50      **9** \$145.20      **10** 798
- 11** \$1 160 000      **12** B      **13** \$80.10
- 14 a** \$540      **b** \$378      **c** \$92      **d** 19.6%
- 15** 650      **16** \$423.30      **17** 510
- 18** Less than the original price, \$673.20

### Exercise 6.08

- 1 a** 8 kg      **b** 45 mm      **c** 6 L      **d** \$250
- 2** C
- 3 a** 18 m      **b** 9 g      **c** 3 h  
**d** 1 L      **e** \$20      **f** 12 km  
**g** 5 mL      **h** 6 days      **i** 75 kg
- 4 a** 6 t      **b** 4 h  
**c** 30 sheep      **d** \$9
- 5 a** 7      **b** \$40      **c** 48 min  
**d** \$63      **e** 150 cm      **f** 80 mL
- 6** B
- 7 a** \$9      **b** 5 kg      **c** 20 kL
- 8 a** \$100      **b** 154      **c** \$200  
**d** 42      **e** \$270      **f** 54
- 9 a** \$279      **b** 96      **c** \$70  
**d** 57      **e** \$300      **f** 500
- 10 a** 24      **b** 10

### Mental skills 6B

- 2 a** \$308      **b** 60      **c** 30      **d** \$450  
**e** 96      **f** \$90      **g** \$60.50      **h** 150  
**i** 210      **j** \$84      **k** \$300      **l** 98
- 4 a** \$360      **b** 40      **c** 88      **d** \$22.50  
**e** 450      **f** \$63      **g** \$80      **h** 50  
**i** \$50.40      **j** \$87.50      **k** 225      **l** \$105

### Exercise 6.09

- 1 a** \$700      **b** \$560      **c** \$4600  
**d** \$1900      **e** 400 cm      **f** 280 kg  
**g** 3 m      **h** 150 min      **i** \$400  
**j** \$360      **k** 400 kg      **l** 110 min
- 2** \$1200      **3** 79 800      **4** \$82 176
- 5** \$15 250      **6** D      **7** 24 000
- 8** \$3000      **9** \$300      **10** \$435

### Exercise 6.10

- 1 a i** \$18 700      **ii** Loss  
**b i** \$543 000      **ii** Profit  
**c i** \$799      **ii** Loss  
**d i** \$6800      **ii** Profit
- 2 a i** \$17      **ii** 20%  
**b i** \$185      **ii** 44.6%  
**c i** \$1.45      **ii** 52.7%
- 3 a i** \$5      **ii** 26.3%  
**b i** \$1250      **ii** 46.3%  
**c i** \$21      **ii** 26.6%
- 4** C
- 5 a** \$150      **b** 12%
- 6 a** \$1800      **b** 10.6%
- 7 a** \$234      **b** \$71.40      **c** \$468  
**d** \$1267      **e** \$6.25      **f** \$16.20
- 8** 23.31%      **9** 44.4%
- 10 a** \$2090, \$22 990      **b** \$181, \$1991  
**c** \$0.30, \$3.30      **d** \$14.50, \$159.50  
**e** \$18, \$198      **f** \$2.70, \$29.70
- 11 a** \$72, \$720      **b** \$18, \$180      **c** \$84, \$840  
**d** \$1.70, \$17      **e** \$3.15, \$31.50      **f** \$1.52, \$15.18
- 12 a** \$1440      **b** \$1584      **c** \$950.40  
**d** \$86.40      **e** Loss of \$35      **f** 4.0%

### Exercise 6.11

- 1** D
- 2 a** \$120      **b** \$720      **c** \$262.40  
**d** \$6      **e** \$1706.25      **f** \$3777.75  
**g** \$393.68      **h** \$588      **i** \$42.36  
**j** \$2428.38
- 3 a** \$1350      **b** \$2250      **c** \$11 200  
**d** \$108 000      **e** \$101.50      **f** \$6255  
**g** \$4981.62      **h** \$540      **i** \$36.85  
**j** \$374.40
- 4 a** \$27      **b** \$11.38      **c** \$18.75  
**d** \$1020      **e** \$3.96      **f** \$225.50  
**g** \$988.17      **h** \$186.43      **i** \$12.25  
**j** \$1364.18
- 5 a** \$735      **b** \$7735
- 6 a** \$10 500      **b** \$40 500      **c** \$675
- 7 a** \$1620      **b** 4 years

### Exercise 6.12

- 1** 27      **2** 81.25%      **3** 80%
- 4** \$41.25      **5** 60%      **6** 234 points
- 7** 348      **8** 37.5%      **9** 40%
- 10** 12.5%      **11** \$8625      **12** 11.4%
- 13** \$262.50      **14** C      **15** \$4369.95
- 16** \$44 561.25

### Power plus

- 1** \$96.80
- 2 a** \$1627.50      **b** \$1765.84
- 3 a** \$499 200      **b** \$519 168      **c** \$583 993.39

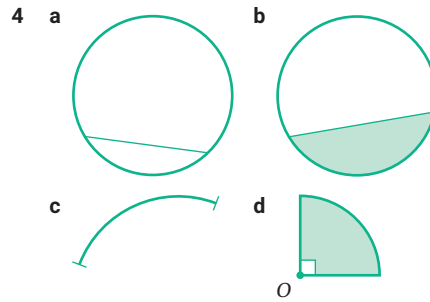
- 4 a Less                      b 20%  
 5 a \$357 000                b \$303 500                c \$186 400  
 6 a Less                      b 50%

### Test yourself 6

- 1 a  $\frac{3}{4}$                       b  $\frac{7}{12}$                       c  $\frac{7}{9}$   
 2 a  $3\frac{3}{4}$                       b  $4\frac{2}{5}$                       c  $4\frac{1}{3}$   
 3 a  $\frac{9}{2}$                       b  $\frac{11}{3}$                       c  $\frac{34}{5}$   
 4  $\frac{5}{6}, \frac{3}{4}, \frac{7}{12}, \frac{1}{2}$   
 5 a  $\frac{11}{15}$                       b  $\frac{1}{14}$                       c  $1\frac{5}{12}$   
    d  $6\frac{7}{10}$                       e  $6\frac{1}{6}$                       f  $2\frac{7}{8}$   
 6  $\frac{3}{8}$   
 7 a  $\frac{7}{18}$                       b  $\frac{8}{15}$                       c  $\frac{15}{28}$   
    d  $\frac{27}{40}$                       e  $\frac{2}{5}$                       f  $3\frac{7}{12}$   
 8 16 500  
 9 a  $\frac{37}{50}$                       b  $\frac{29}{100}$                       c  $\frac{13}{20}$                       d  $1\frac{57}{100}$   
 10 a 0.12                      b 0.162                      c 0.02                      d 0.054  
 11 a 87.5%                      b 24%                      c  $22\frac{2}{9}\%$                       d 82.5%  
 12 a 56%                      b 61.3%                      c 70%                      d 4.8%  
 13 0.7, 0.725,  $\frac{3}{4}$ , 77%  
 14 a 6                      b 16                      c \$242  
    d 8 months                      e 108 L                      f 210 cm  
 15 a 24.31 kg                      b 162.69 kg  
 16 a i  $\frac{4}{5}$                       ii 80%  
    b i  $\frac{3}{4}$                       ii 75%  
    c i  $\frac{11}{20}$                       ii 55%  
 17 a  $\frac{17}{20}$                       b 85%  
 18 48.1%                      19 \$327                      20 \$67 275  
 21 a 11 t                      b 12 cm                      c 9 min  
 22 \$147 111.11                      23 20%  
 24 a \$8.70                      b \$87.00  
 25 \$42.50                      26 57.6%

### Practice set 2

- 1 a  $\frac{1}{2}$                       b  $\frac{1}{3}$                       c  $\frac{3}{5}$   
 2 a  $y = 65$  (angles on a straight line)  
    b  $k = 135$  (vertically opposite angles),  $l = 45$   
    (angles on a straight line)  
    c  $x = 313$  (angles at a point)  
    d  $q = 62$  (angles in a right angle)  
 3 a  $60 \text{ cm}^2$                       b  $110 \text{ cm}^2$                       c  $60 \text{ cm}^2$                       d  $880 \text{ mm}^2$



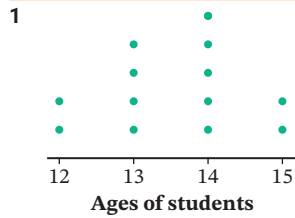
- 5 a i scalene                      ii right-angled  
    b i scalene                      ii acute-angled  
    c i isosceles                      ii acute-angled  
    d i equilateral                      ii acute-angled  
 6 a  $m = 60$                       b  $x = 50$                       c  $k = 65$                       d  $m = 60$   
 7 a  $\frac{5}{2}$                       b  $\frac{7}{4}$                       c  $\frac{22}{5}$   
 8 a i  $\frac{1}{4}$                       ii 0.25  
    b i  $\frac{2}{5}$                       ii 0.4  
    c i  $\frac{17}{20}$                       ii 0.85  
    d i  $\frac{1}{8}$                       ii 0.125  
 9 a  $d = 78$  (alternate angles on parallel lines)  
    b  $f = 112$  (corresponding angles on parallel lines)  
    c  $t = 72$  (co-interior angles between parallel lines)  
 10 a 34%                      b 75%                      c 21.5%                      d 62.5%  
 11 a parallelogram  
    b rectangle                      c square                      d kite  
 12 a  $248.62 \text{ m}^2$                       b  $22.68 \text{ cm}^2$                       c  $90.2 \text{ m}^2$   
 13 a  $5\frac{1}{2}$                       b  $6\frac{1}{3}$                       c  $3\frac{1}{2}$   
 14 a  $1\frac{1}{5}$                       b  $\frac{11}{15}$                       c  $\frac{7}{20}$                       d  $4\frac{1}{10}$   
    e  $1\frac{1}{3}$                       f  $\frac{3}{10}$                       g  $\frac{3}{5}$                       h  $1\frac{3}{5}$   
 15 a  $137 \text{ m}^2$                       b  $112.5 \text{ cm}^2$   
 16 a 31.42 cm                      b 21.99 cm  
 17 a  $78.54 \text{ cm}^2$                       b  $38.48 \text{ cm}^2$   
 18 a  $x = 130$  (exterior angle of a triangle)  
    b  $m = 50$  (exterior angle of a triangle)  
    c  $n = 35$  (exterior angle of a triangle)  
    d  $p = 105$  (angle sum of a quadrilateral)  
    e  $k = 40$  (angle sum of a quadrilateral)  
    f  $x = 90$  (angle sum of a quadrilateral)

- 19 \$2.30                      20 26.928 L  
 21 a  $4752 \text{ cm}^3$                       b  $640 \text{ m}^3$   
 22 a  $36\,000 \text{ cm}^2$                       b  $8.75 \text{ cm}^2$   
 23  $\frac{3}{5}$ , 63%, 0.67,  $\frac{6}{7}$   
 24 a true                      b false                      c true                      d false  
 25 a \$0.30                      b 528 kg                      c \$4.80                      d 15 min

- 26 a 40%    b 35%    c 50%
- 27 3281
- 28 a 15.42 cm    b 91.42 mm    c 80.55 cm
- 29 a 14.14 cm<sup>2</sup>    b 557.08 mm<sup>2</sup>    c 339.29 cm<sup>2</sup>
- 30 A    31 589.0 cm<sup>2</sup>    32 \$1360
- 33 a \$499    b 45.4%
- 34 a 62.1 m<sup>2</sup>    b 55.2 m<sup>2</sup>
- 35 a 942.5 cm<sup>3</sup>    b 14 726.2 mm<sup>3</sup>

## Chapter 7

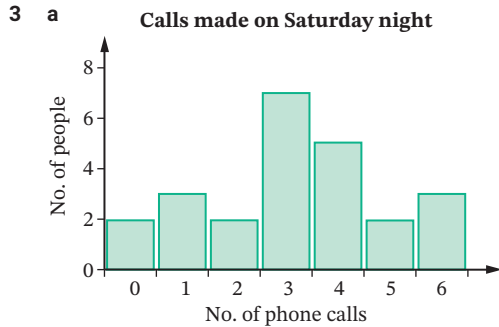
### SkillCheck



2 a

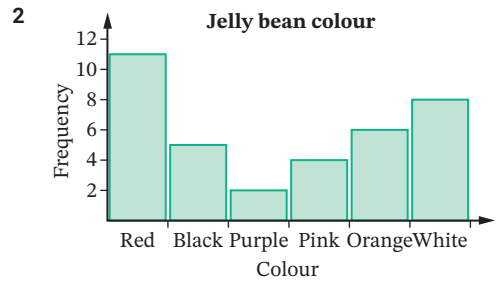
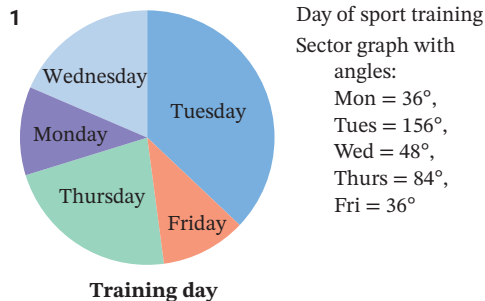
Stem	Leaf
3	0
4	7 8 8 9
5	4 9 9
6	3 4 8 8 8

b 30



- b 24    c 3    d 0, 2 and 5    e 6
- 4 a 53    b 10    c 240

### Exercise 7.01



3 Hours of sleep

6	7	8	9	10	11
---	---	---	---	----	----

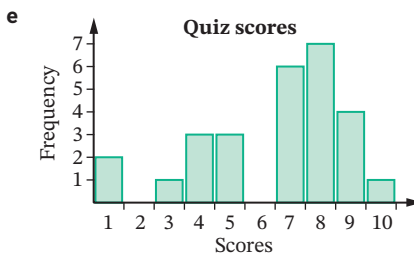
6 = 0.75 cm, 7 = 2.25 cm, 8 = 2.75 cm,  
9 = 1.5 cm, 10 = 1.25 cm, 11 = 0.5 cm

4 D

5 a

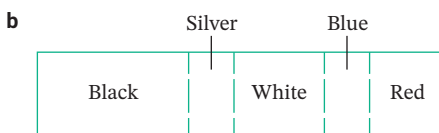
Score	Tally	Frequency
1		2
2		0
3		1
4		3
5		3
6		0
7		6
8		7
9		4
10		1
	<b>Total</b>	27

b 10    c 3    d 8



6 a

Colour	Frequency
Black (B)	10
Silver (S)	3
White (W)	6
Blue (U)	3
Red (R)	5
<b>Total</b>	27



c Black

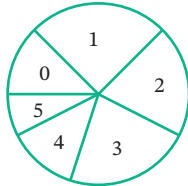
7 a

No. of siblings	Tally	Frequency
0		5
1		10
2		8
3		9
4		5
5		3
	<b>Total</b>	<b>40</b>

b 5

c 1

d Sector graph with angles:  $0 = 45^\circ$ ,  $1 = 90^\circ$ ,  
 $2 = 72^\circ$ ,  $3 = 81^\circ$ ,  $4 = 45^\circ$ ,  $5 = 27^\circ$



No. of siblings

### Exercise 7.02

- 1 a N      b C      c N      d N  
 e N      f C      g N      h N
- 2 a D      b C      c D      d D  
 e C      f D      g C      h D
- 3 D
- 4 a C      b C      c ND      d C  
 e ND      f NC      g ND      h C

### Exercise 7.03

- 1 a 1.6      b 1 and 2
- 2 a 6.75, 6      b 4.71, 2      c 4.88, 1 and 7  
 d 70.44, 96      e 47.25, no mode
- 3 See answers to question 2.
- 4 a Hyundai      b spade      c Korean
- 5 Data are categorical, not numerical.

### Mental skills 7

- 2 a
- b
- c
- d
- e
- f
- g
- h

- 6 a 7.71      b 7.0  
 c Mean, every value is involved in calculating it.
- 7 C
- 8 a Carrozza 26.3, Binns 33.3  
 b Binns family has higher values, outlier of 93.  
 c Binns family has higher mean.
- 9 a 8Y 6.1; 8Z 6.1  
 b 8Z's marks are more spread out.  
 c 4
- 10 2940
- 11 a \$1812.50      b \$2750
- 12 Teacher to check.

### Exercise 7.04

- 1 B      2 D
- 3 a i 8      ii 7  
 b i 47.5      ii 10  
 c i 12      ii 4  
 d i 51      ii 99  
 e i 57      ii 0  
 f i 82.35      ii 37.4
- 4 a  $-\$0.57$   
 b median  $\$9.50$ , mode  $-\$25$   
 c No. His winnings are small and his loss big.  
 Not worth the effort.
- 5 a no mode      b  $\$686\ 000$       c  $\$771\ 845.45$   
 d Median, because it's not affected by the outlier  
 of  $\$1\ 670\ 000$ .
- 6 a Aldo 168.1, Peter 175.7  
 b Aldo 35, Peter 6  
 c i Aldo, higher mean.  
 ii Peter is more consistent, lower range.
- d 194
- 7 C
- 8 a Daniel 29.68, Cristian 29.08  
 b Daniel 5, Cristian 4.5  
 c Cristian, he is consistent and fast.
- 9 6, 7, 8 or 9      10 Teacher to check.

### Exercise 7.05

1 a 34 b 2 c 2.1 d 2 e 8

2 a 24 b 11 c 8.6 d 5 e 9

3 a

Judge's score, $x$	Frequency, $f$	$fx$
1	2	2
3	1	3
4	3	12
5	3	15
7	6	42
8	7	56
9	4	36
10	1	10
<b>Total</b>	27	176

b 8 c 6.5 d 7 e 9

4 a 5 b 2 c 2.5 d 2.8

5 a 37 b 1.47 c 0.1 d 1.48 e 1.48

6 A

7 a 7 b 3 c 3 d 3.4

8 a 12 b 15 c 14.5

### Exercise 7.06

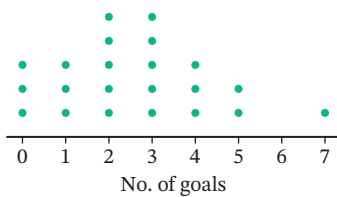
1 a i 4 ii 11 iii 10 iv 9.8

b i 4 ii 24 iii 22 iv 22.3

c i 6 ii 36 iii 37 iv 37.6

d i 0.3 ii 1.8 iii 1.8 iv 1.8

2 a

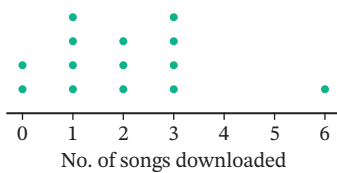


b 22 c 7 d 2.5 e 2.6

3 a 18 b 8 c 22 and 25

d 22.3 e 71% f B

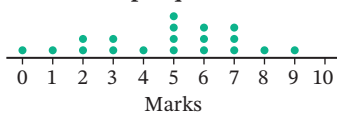
4 a



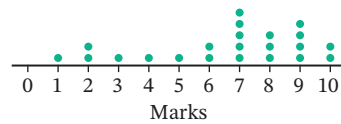
b 14 c 6 d 2 e 2 f 14

5 a

#### 8 Hamper quiz marks



#### 8 Yen quiz marks



b 7 c 5 d 9

e

$x$	$f$	$fx$
0	1	0
1	1	1
2	2	4
3	2	6
4	1	4
5	4	20
6	3	18
7	3	21
8	1	8
9	1	9
<b>Total</b>	19	91

$$\bar{x} \approx 4.8$$

f 8 Yen, marks clustered around higher values 7 to 9.

6 a i 39 ii 33 iii 33 iv 30.1

b i 26 ii 94 iii 88 iv 86.3

c i 40 ii 131 iii 124.5 iv 121.5

d i 44 ii 17 iii 17 iv 21.7

7 a

Stem	Leaf
7	6
8	
9	2 5 7 8
10	1 1 5 5 6 8
11	2 4 7
12	4

b 76 c 101, 105 d 124

e 9, 10, 11 f 66.7%

8 a

Stem	Leaf
13	7
14	5
15	4 5 6 7 8 8 9
16	0 0 1 3 3 4 4 5 6 7 7 7 9
17	15

b 16 c 24 d 2

e 38 f 162

9 a 19 b 1

c Fuller's Ridge Rd, times are clustered around the lower values.

d D

10 a 16 b 8 c 30

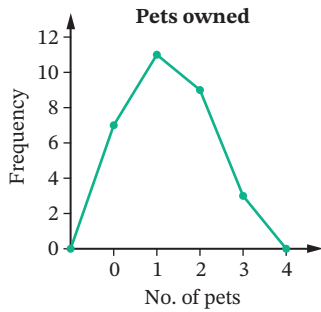
d 9, 13 and 30 e 30

f Narrabri Lions

g Wee Waa Reds, it has a range of 28 compared to Narrabri Lion's 26.

### Exercise 7.07

1 a

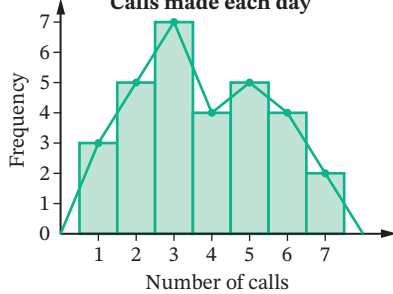


- b 30      c 7      d 30%  
e 1      f B

2 a

x	f
1	3
2	5
3	7
4	4
5	5
6	4
7	2
	30

b Calls made each day



- c 7      d 113      e 8      f 3      g 3.8

3 a 25      b 1      c 1      d 4

e

x	f	fx
1	13	13
2	5	10
3	3	9
4	1	4
5	3	15
	25	51

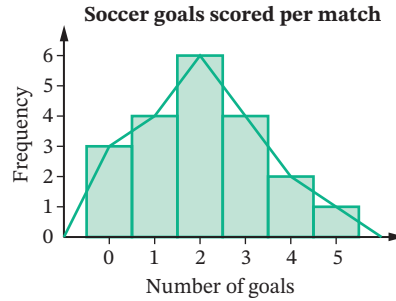
$$\bar{x} = 2.04$$

f 1

4 a

x	f
0	3
1	4
2	6
3	4
4	2
5	1
	20

b



- c 20      d 5      e 2  
f 2.05      g 7      h 15%  
5 a 5, 6, 9, 12, 4, 8, 44      b 4  
c 5      d 155      e 154.64  
f 11      g 155      h 24

### Exercise 7.08

- 1 a i 37      ii 49      iii 52.5      iv 55.3  
b Mean, because there are no outliers.  
2 a i 24      ii 32      iii 37      iv 36.4  
b i increase      ii no change  
    iii decrease      iv decrease  
3 a 30      b B  
c Grades are categorical data, not quantitative (numerical).  
4 a i \$427 000      ii \$91 500      iii \$135 000  
b There is no mode, and the mean is affected by the outlier of \$484 000.  
c Mean \$103 727, median \$90 000, yes.  
5 a i 192.4 cm      ii 193 cm  
    iii no mode      iv 23  
b i decrease      ii no change  
    iii There will be a mode of 181  
    iv no change  
6 a D      b Sunjeet 32.8, Chris 33.7  
c i Sunjeet      ii Chris  
d Sunjeet: his scores are consistently higher.

7 a

Forbes			Cobar			
9	6	2	0	3	6	7
			4	1	9	9
8	5	4	5	1	1	8
9	5	3	1	6	0	5
			6	5	1	7
			4	0	0	8
			1	0	9	7

	Mean	Mode	Median	Range
Forbes	62.7	80	64	61
Cobar	56.2	49, 51	51	67

**c** Forbes, it has a higher mean, mode and median.

**d** 97, mean

**8 a**

	Mean	Mode	Median	Range
Christina	20.9	19, 25	21.5	31
Mary	21.9	17, 20	20	21

**b** Mary, lower range    **c** Mary

**d** Mary, higher mean    **e** 4

**f** i no                      **ii** yes



**b** Delta: range 7, median 6; Guy: range 5, median 5.5

**c** Other than the outlier of 2, Delta allocates higher marks, while Guy's marks are spread out.

### Exercise 7.09

**1 a** sample    **b** census    **c** sample    **d** sample  
**e** sample    **f** census    **g** census    **h** census

**2 a** sample, survey    **b** sample, survey  
**c** census, observation    **d** sample, survey  
**e** sample, survey    **f** census, measurement  
**g** sample, measurement    **h** census, survey

**3 C**                      **4** Teacher to check.

**5 a** Not random, students volunteered themselves for the survey rather than be chosen.

**b** Random.

**c** Not random, many people do not have their phone numbers listed in the book.

**d** Random.

**e** Not random, station focuses on rock music only, and listeners call in to vote rather than be randomly selected.

**6** Teacher to check.

### Exercise 7.10

**1 a** What we mean by happy is not clear

**b** Too many possible answers

**c** Too personal and possibly unclear

**d** Uses emotion to manipulate possible answers

**e** Too personal

**f** What is included in take-away food is not clear

**g** Not all computer brands are covered by the choices given

Teacher to check alternative questions

**2, 3** Teacher to check

### Exercise 7.11

Teacher to check all answers

### Power plus

**1 a** 74.2                      **b** 77.2  
**c** Increased by 3.            **d** Does the same to the mean.

**2** 92%

**3** No, but the values will be centred around 20 (teacher to check).

**4 a** 40                      **b, c** Teacher to check.

**5** Yes. The sum of the 4 sisters' wages is \$8000, so each of the other 2 sisters earn much more (the sum of their wages is \$6700.).

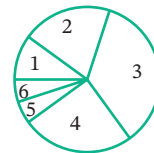
### Test yourself 7

**1 a**

x	f
1	2
2	4
3	7
4	5
5	1
6	1
	20

**b** 3                      **c** 5                      **d** 10%

**e** Sector graph with angles: 1 = 36°, 2 = 72°, 3 = 126°, 4 = 90°, 5 = 18°, 6 = 18°



No. of computers owned

**2 a** NC                      **b** C                      **c** ND  
**d** NC                      **e** C                      **f** NC

**3 a** i 8.78    **ii** 6                      **iii** 10                      **iv** 6  
**b** i 3.5    **ii** 1                      **iii** 3.5                      **iv** 7  
**c** i 22.6    **ii** no mode    **iii** 23                      **iv** 5

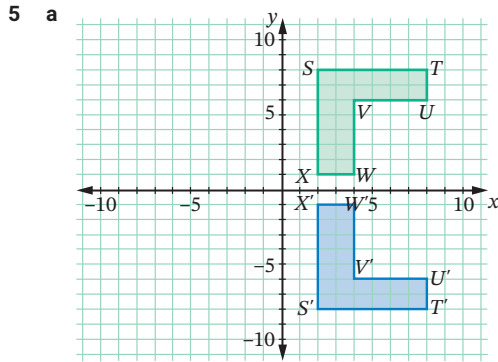
**4 a** 0, 7, 12, 12, 8, 5, 6, totals 24, 50

**b** 24    **c** 6                      **d** 1                      **e** 2                      **f** 2.08

**5 a** i 4                      **ii** 35                      **iii** 33                      **iv** 34.6

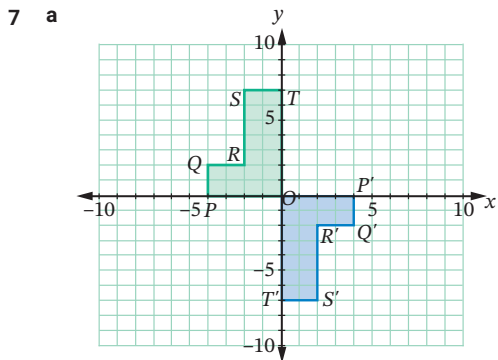
**b** i 35                      **ii** 144                      **iii** 148                      **iv** 140.25





- b  $S(2, 8) \rightarrow S'(2, -8)$ ,  $T(8, 8) \rightarrow T'(8, -8)$ ,  
 $U(8, 6) \rightarrow U'(8, -6)$ ,  $V(4, 6) \rightarrow V'(4, -6)$ ,  
 $W(4, 1) \rightarrow W'(4, -1)$ ,  $X(2, 1) \rightarrow X'(2, -1)$   
 The  $x$ -coordinate of each vertex does not change while the  $y$ -coordinate changes sign.

- 6 a Rotation  $180^\circ$  clockwise about  $S(0, 0)$   
 b  $S(0, 0) \rightarrow S'(0, 0)$ ,  $T(3, 0) \rightarrow T'(-3, 0)$ ,  
 $U(3, -4) \rightarrow U'(-3, 4)$ ,  $V(5, -4) \rightarrow V'(-5, 4)$ ,  
 $W(5, 0) \rightarrow W'(-5, 0)$ ,  $X(8, 0) \rightarrow X'(-8, 0)$ ,  
 $Y(8, -7) \rightarrow Y'(-8, 7)$ ,  $Z(0, -7) \rightarrow Z'(0, 7)$   
 The  $x$ - and  $y$ -coordinates of each vertex change sign.



- b  $Q(-4, 2) \rightarrow Q'(4, -2)$ ; The  $x$ - and  $y$ -coordinates both change sign.  
 8 a Translation 8 units right and 2 units down.  
 b  $W(-6, 8) \rightarrow W'(2, 6)$ ;  $X(-2, 1) \rightarrow X'(6, -1)$ ;  
 $Y(-6, 1) \rightarrow Y'(2, -1)$   
 The  $x$ -coordinate of each vertex increases by 8 units while the  $y$ -coordinate decreases by 2 units.

### Exercise 8.02

- 1 A and H, B and K, E and L, F and P  
 2 a D and J b C c H  
 3 Other answers possible.  
 a  $ABCD \equiv JKLI$  b  $\triangle MNO \equiv \triangle PRQ$   
 c  $NOPQ \equiv RSTU$  d  $\triangle ACB \equiv \triangle EDF$   
 e  $WXYZ \equiv KLMJ$  f  $JKLMNO \equiv STUPQR$

- 4 Other answers possible.  
 a  $\angle F, DE$  b  $\angle P, RQ$   
 c  $\angle Q, OP$  d  $\angle R, WV$   
 e  $\angle IHG, EF$   
 f  $\angle QRS$  (or  $\angle PON$ ),  $ON$  (or  $RS$ )  
 g  $\angle EDH$  (or  $\angle FGH$ ),  $NJ$  h  $\angle YXW, ZU$

- 5 A  
 6 a i  $AB = DE, BC = EF, AC = DF$   
 ii  $\angle A = \angle D, \angle B = \angle E, \angle C = \angle F$   
 b i  $LM = RQ, MN = QP, LN = RP$   
 ii  $\angle L = \angle R, \angle M = \angle Q, \angle N = \angle P$   
 c i  $AB = DF, AC = DE, CB = EF$   
 ii  $\angle A = \angle D, \angle B = \angle F, \angle C = \angle E$   
 d i  $PQ = CD, QR = DE, PR = CE$   
 ii  $\angle P = \angle C, \angle Q = \angle D, \angle R = \angle E$



### Exercise 8.03

- 1 Teacher to check.  
 2 a  $\triangle MNO$  b  $60^\circ$   
 3 a  $\triangle HIJ$  b 2 cm  
 4 a different b congruent c different  
 d different e different f congruent  
 g congruent

### Mental skills 8A

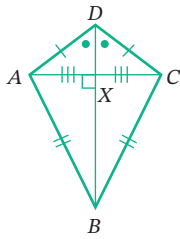
- 2 a 12:25 p.m. b 1:10 a.m. c 10:50 p.m.  
 d 10:55 p.m. e 06:10 f 00:10  
 g 9:10 a.m. h 3:15 a.m. i 11:00  
 j 23:05 k 12:20 a.m. l 11:35 a.m.  
 4 a 6:05 p.m. b 6:40 a.m. c 12:10 p.m.  
 d 2:50 a.m. e 12:45 f 03:55  
 g 10:50 p.m. h 12:15 p.m. i 15:45  
 j 04:00

### Exercise 8.04

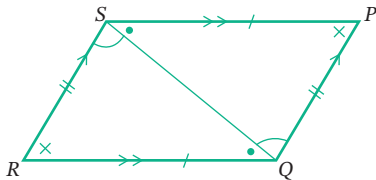
- 1 B  
 2 a SAS b AAS c AAS d SSS  
 e RHS f SAS g AAS h SSS  
 i RHS j SAS  
 3 a B b  $\triangle ABC \equiv \triangle DEF$   
 4 a  $p = 2, n = 20$  b  $x = 15, y = 3$   
 c  $x = 58$  d  $x = 4, y = 60$   
 5 a AAS,  $x = 6$  b AAS,  $x = 6$   
 6 a Vertically opposite angles.  
 b SAS  
 c  $\triangle PQR \equiv \triangle STR$  d  $y = 28$   
 e  $\angle S$   
 f Alternate angles are equal.

### Exercise 8.05

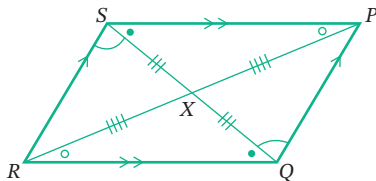
- 1 a SSS                      b  $\angle C$                       c  $\angle CDB$   
 d                                      e SAS



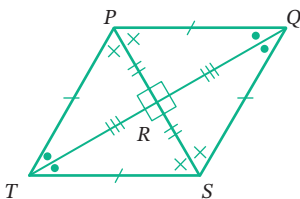
- f  $XC$                       g  $\angle DXC$                       h  $90^\circ$   
 i The diagonals intersect at right angles.  
 2 a alternate angles on parallel lines  
 b  $\angle QSR$                       c AAS  
 d  $RQ$                               e  $SR$   
 f opposite sides are equal  
 g  $\angle R$   
 h opposite angles are equal



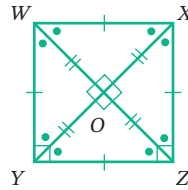
- 3 a  $\angle XRQ$                       b AAS                              c  $XQ$   
 d  $XR$                               e Diagonals bisect each other.



- 4 a SSS  
 b  $90^\circ$ , 4 equal angles at a point (in a revolution) add up to  $360^\circ$ .  
 b, d, e, f



- c The diagonals intersect at right angles.  
 g The diagonals bisect the angles of the rhombus.  
 5 a SAS                              b  $XZ$   
 c Diagonals are equal. e SSS  
 f  $90^\circ$                               g Diagonals bisect at right angles.  
 h  $45^\circ$



- i Diagonals bisect the angles of a square.

### Exercise 8.06

- 6 c SAS                      d  $\angle B$                               e  $90^\circ$                               f equal

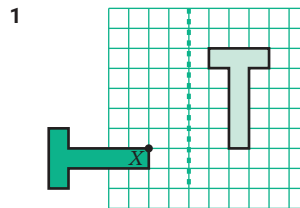
### Mental skills 8B

- 2 a 8 h 30 min                      b 5 h 40 min                      c 3 h 25 min  
 d 8 h 15 min                      e 11 h 25 min                      f 1 h 40 min  
 g 5 h 10 min                      h 5 h 45 min                      i 7 h 55 min  
 j 7 h 40 min

### Power plus

- 1 a  $WX; XY$ , equal sides of a kite;  $WY$   
 b  $AC$ ,  $\triangle ABC$  is isosceles;  $DC$ , the midpoint of  $BC$ ; common; SSS  
 c  $JK$ ; opposite sides of a parallelogram;  $GK$ , opposite sides of a parallelogram;  $GKJ$ , opposite angles of a parallelogram;  $GHI, JKG$ , SAS  
 2 a all angles  $90^\circ$ /equal                      b all sides equal  
 c all sides equal  
 3 a parallelogram, rectangle, rhombus, square  
 b kite, rhombus, square  
 c rectangle, square  
 d rectangle, square  
 e parallelogram, rectangle, rhombus, square  
 f parallelogram, rectangle, rhombus, square

### Test yourself 8



- 1  
 2 a Reflection across the  $y$ -axis.  
 b  $C(5, -4) \rightarrow (-5, -4)$ , the  $x$ -coordinate changes sign while the  $y$ -coordinate stays the same.  
 3 i a  $AB = UT$  or  $BC = TS$  or  $AC = US$   
 b  $\angle A = \angle U$  or  $\angle B = \angle T$  or  $\angle C = \angle S$   
 c  $\triangle ABC \cong \triangle UTS$   
 ii a  $DE = WX$  or  $FE = VX$  or  $DF = WV$   
 b  $\angle D = \angle W$  or  $\angle E = \angle X$  or  $\angle F = \angle V$   
 c  $\triangle DEF \cong \triangle WXV$   
 iii (other answers possible)  
 a  $GH = OM$  or  $IH = NM$  or  $GI = ON$   
 b  $\angle G = \angle O$  or  $\angle H = \angle M$  or  $\angle I = \angle N$   
 c  $\triangle GHI \cong \triangle OMN$

- iv (other answers possible)  
 a  $JK = RQ$  or  $KL = QP$  or  $JL = RP$   
 b  $\angle J = \angle R$  or  $\angle K = \angle Q$  or  $\angle L = \angle P$   
 c  $\triangle JKL \cong \triangle RQP$
- 4 b no
- 5 a SAS                      b RHS                      c AAS
- 6 a SSS  
 b 4 equal matching angles at  $R$  add up to  $360^\circ$ , so each angle is  $90^\circ$ .  
 c  $\angle PTR, \angle STR, \angle SQR$   
 d i false                      ii true                      iii true

## Chapter 9

### SkillCheck

- 1 a 0.85                      b 0.375                      c 0.02                      d 0.3
- 2 a {head, tail}                      b {1, 2, 3, 4, 5, 6}  
 c {female, male}                      d {red, amber, green}  
 e {win, lose, draw}                      f {pass, fail}
- 3 a 70%                      b 56%                      c  $66\frac{2}{3}\%$                       d 24%
- 4 a  $\frac{2}{3}$                       b  $\frac{3}{5}$                       c  $\frac{5}{8}$
- 5 C
- 6 a  $\frac{7}{25}$                       b  $\frac{1}{50}$                       c  $\frac{16}{25}$                       d  $\frac{4}{5}$
- 7 Answers will vary between students.

### Exercise 9.01

- 1 a i {red, blue}                      ii  $\frac{1}{2}$   
 b i {red, blue, yellow, green}                      ii  $\frac{1}{4}$   
 c i {red, blue}                      ii  $\frac{1}{2}$   
 d i {red, white}                      ii  $\frac{1}{5}$   
 e i {red, white, black, green}                      ii  $\frac{1}{4}$   
 f i {red, green, yellow}                      ii  $\frac{1}{2}$
- 2 a 2, equally likely                      b 3, not equally likely  
 c 26, not equally likely                      d 2, equally likely  
 e 10, equally likely                      f 2, not equally likely
- 3 a {1, 3, 5}                      b {A, E, I, O, U}  
 c {5, 6, 7, 8, 9}                      d {April, August}  
 e {NSW, Qld, SA, Tas., Vic., WA}  
 f {Years 7, 8, 9, 10, 11, 12}
- 4 a  $\frac{2}{20} = \frac{1}{10}$                       b  $\frac{3}{20} = 0.15$                       c  $\frac{11}{20} = 55\%$   
 d  $\frac{15}{20} = \frac{3}{4}$                       e  $\frac{7}{20} = 0.35$                       f  $\frac{13}{20} = 65\%$
- 5 a  $\frac{3}{16}$                       b  $\frac{8}{16} = \frac{1}{2}$   
 c  $\frac{14}{16} = 0.875$                       d  $\frac{10}{16} = 62.5\%$
- 6 C

- 7 a {win, lose, draw}  
 b No, teams have different abilities.
- 8 D
- 9 a 3    b {5, 6, 7, 8}

c

Outcome	5	6	7	8
Probability as a fraction	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{6}$	$\frac{1}{4}$
Probability as a decimal	0.25	0.3	0.16	0.25
Probability as a percentage	25%	$33\frac{1}{3}\%$	$16\frac{2}{3}\%$	25%

- 10 C
- 11 a C                      b A                      c E                      d H  
 e D                      f G                      g B                      h F
- 12 a 52                      b Yes                      c 4  
 d 13                      e 2  
 f i  $\frac{1}{2}$                       ii  $\frac{1}{4}$                       iii  $\frac{1}{52}$   
 iv  $\frac{1}{13}$                       v  $\frac{5}{13}$                       vi  $\frac{3}{26}$
- 13 a low                      b 9
- 14 Teacher to check.
- 15 a 1                      b 5                      c 9                      d 10

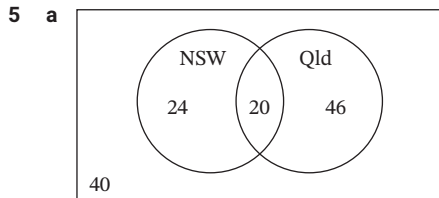
### Exercise 9.02

- 1 a tossing heads  
 b sunny day tomorrow  
 c selecting a brown chocolate  
 d rolling 1, 2, 3, 4 or 5  
 e losing or having a draw (not winning)  
 f selecting a diamonds, clubs or spades card (not selecting hearts)  
 g born in spring, summer or autumn (not being born in winter)  
 h being 15 or over
- 2 A
- 3 a  $\frac{1}{6}$                       b  $\frac{5}{6}$                       c  $\frac{1}{2}$                       d  $\frac{1}{2}$   
 e  $\frac{5}{6}$                       f  $\frac{2}{3}$
- 4 a  $\frac{1}{3}$                       b  $\frac{2}{3}$                       c  $\frac{5}{6}$                       d 1
- 5 a  $\frac{45}{56}$                       b D
- 6 a  $\frac{1}{6}$                       b  $\frac{5}{6}$
- 7 0.8    8  $\frac{199}{200}$
- 9 a  $\frac{3}{26}$                       b  $\frac{23}{26}$                       c 1  
 d  $\frac{11}{26}$                       e  $\frac{9}{13}$                       f  $\frac{1}{2}$
- 10 a  $\frac{12}{13}$                       b 39%                      c 0.85
- 11 a 0.65                      b 0.35  
 c Red 16, Blue 14, White 10  
 d 0

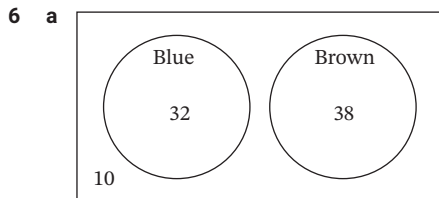
- 12 a  $\frac{3}{4}$     b  $\frac{1}{2}$     c  $\frac{1}{2}$     d 0  
 13 15%    14 C  
 15 a  $\frac{7}{16}$     b  $\frac{9}{16}$   
 16 a  $\frac{10}{11}$     b  $\frac{7}{11}$     c  $\frac{9}{11}$     d  $\frac{8}{11}$   
 17 a  $\frac{2}{5}$     b  $\frac{3}{5}$     c  $\frac{4}{5}$     d  $\frac{3}{5}$   
 18 a  $\frac{1}{4}$     b  $\frac{3}{4}$     c  $\frac{1}{2}$

### Exercise 9.03

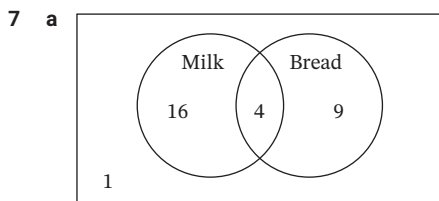
- 1 a 50    b 21    c 42  
 d 33    e 8    f A  
 2 a Yes, mutually exclusive    b 6  
 c 40    d 46    e 0  
 3 a No    b 52    c 4  
 d i 0.808    ii 0.731    iii 1    iv 0.192  
 e right-handed male  
 4 a 440    b 368    c 15    d A



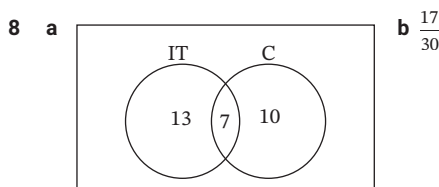
- b 90    c 70    d  $\frac{12}{65}$     e  $\frac{4}{13}$



- b Yes, cannot be both blue-eyed and brown-eyed.  
 c 80    d 70    e 0    f 52.5%



- b 4    c 16  
 d i  $\frac{3}{10}$     ii  $\frac{1}{3}$     iii  $\frac{29}{30}$     iv  $\frac{5}{6}$



### Exercise 9.04

- 1 a 27    b 18    c 2    d  $\frac{4}{9}$   
 e i  $\frac{5}{27}$     ii  $\frac{9}{27} = \frac{1}{3}$   
 2 a 336    b 192    c 96  
 d i  $\frac{11}{21}$     ii  $\frac{4}{21}$     iii  $\frac{17}{21}$   
 3 a 56; 101, 146; 101, 243  
 b 146    c 56  
 d i  $\frac{101}{344}$     ii  $\frac{36}{43}$     iii  $\frac{187}{344}$     iv  $\frac{243}{344}$   
 4 a 125; 70, 110; 165, 310    b 165  
 c i  $\frac{11}{31}$     ii  $\frac{24}{31}$     iii  $\frac{25}{62}$

- d D

5

	Swimming	Not swimming	
Bowling	11	20	31
Not bowling	34	5	39
	45	25	70

- 6 a

	GPS navigation	No GPS navigation	
4-doors	25	42	67
Not 4-doors	3	12	15
	28	54	82

- b i  $\frac{14}{41}$     ii  $\frac{67}{82}$     iii  $\frac{25}{82}$     iv  $\frac{27}{41}$

- 7 a

	Needs glasses	Does not need glasses	
Male	22	60	82
Female	13	85	98
	35	145	180

- b i  $\frac{49}{90}$     ii  $\frac{7}{36}$     iii  $\frac{13}{180}$     iv  $\frac{167}{180}$   
 v  $\frac{2}{3}$     vi  $\frac{107}{180}$

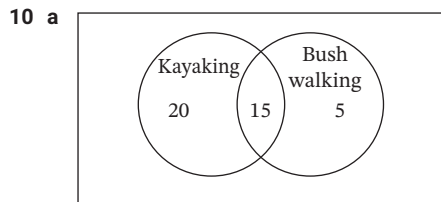
### Mental skills 9

- 2 a 16 000    b 210    c 9900    d 600  
 e 16 000    f 400    g 490    h 52  
 i 1500    j 1360    k 195    l 17 600  
 4 a 8    b 50    c 8    d 22  
 e 4    f 50    g 9    h 9.3  
 i 8.5    j 4.23    k 9.6    l 40.8

### Exercise 9.05

- 1 a  $\frac{17}{28}$     b  $\frac{2}{7}$     c  $\frac{6}{7}$   
 2 a {U, E, C, S}  
 b No, some occur more than others.  
 c i  $\frac{3}{7}$     ii  $\frac{2}{7}$     iii  $\frac{5}{7}$     iv 0

- 3 a {black, red, blue}  
 b i  $\frac{1}{3}$     ii  $\frac{1}{3}$     iii 0  
 c choosing a black or blue sock,  $\frac{2}{3}$
- 4 a 20%    b 40%    c 80%    d 100%
- 5 D
- 6 a  $\frac{1}{100}$     b  $\frac{3}{5}$     c  $\frac{1}{2}$     d  $\frac{17}{20}$
- 7  $\frac{1}{2}$
- 8 a  $\frac{8}{15}$     b  $\frac{3}{5}$     c  $\frac{7}{15}$     d  $\frac{2}{5}$
- 9 a  $\frac{17}{30}$     b  $\frac{1}{10}$     c  $\frac{2}{3}$     d  $\frac{13}{30}$



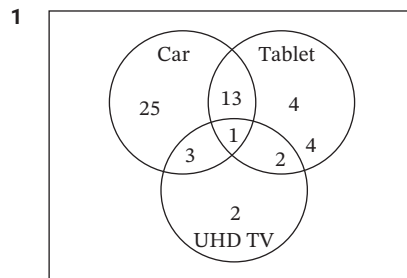
- b i  $\frac{3}{8}$     ii  $\frac{1}{2}$
- 11 0.9
- 12 a 232; 140; 228, 272, 500  
 b i  $\frac{57}{125}$     ii  $\frac{7}{25}$     iii  $\frac{1}{5}$   
 iv  $\frac{32}{125}$     v  $\frac{23}{25}$     vi  $\frac{83}{125}$
- 13 a 0.3    b 5 red, 2 green, 3 purple  
 c 50 red, 20 green, 30 purple  
 d No difference, the probabilities are the same.

### Exercise 9.06

- 1 a  $\frac{1}{4}$     b 125
- 2 Teacher to check.
- 3 a  $\frac{1}{2}$     b 40, less than  
 c  $\frac{11}{20}$     d  $\frac{1}{5}$   
 e 16, the observed frequency was less than expected  
 f  $\frac{11}{80}$
- 4 a 50    b  $\frac{8}{25}$     c  $\frac{9}{50}$   
 d i 400    ii 820
- 5 c i  $\frac{1}{6}$     ii  $\frac{2}{3}$     iii  $\frac{1}{2}$   
 d i 12    ii 48    iii 36  
 g i 167
- 6 46%
- 7 a Yes  
 b Yes, 6 comes up much more often.  
 c  $13\frac{3}{4}\%$     d 11

- 8 a i 0.06    ii 0.22    iii 0.44  
 iv 0.76    v 0.34    vi 0.68  
 b i 8    ii 5, 9    iii 2  
 iv 10    v 10    vi 6, 7

### Power plus



2 a

		1st die					
		1	2	3	4	5	6
2nd die	1	1	2	3	4	5	6
	2	2	4	6	8	10	12
	3	3	6	9	12	15	18
	4	4	8	12	16	20	24
	5	5	10	15	20	25	30
	6	6	12	18	24	30	36

- b 18    c They occur different numbers of times  
 d 6, 12    e 1, 9, 16, 25, 36  
 f i  $\frac{1}{9}$     ii  $\frac{1}{18}$     iii  $\frac{2}{9}$   
 g 4
- 3 No, the probabilities of the 3 events are not equal.
- 4 a {Paul and Summet, Paul and Tash, Paul and Nadine, Sumeet and Tash, Sumeet and Nadine, Tash and Nadine}  
 b  $\frac{1}{2}$

### Test yourself 9

- 1 B
- 2 a  $\frac{1}{6}$     b  $\frac{2}{3}$     c  $\frac{1}{2}$     d  $\frac{1}{3}$
- 3 a 5, 6, 7, 8  
 b i 25%    ii 100%    iii 25%    iv 0%
- 4 a Choosing a card that is not an Ace,  $\frac{12}{13}$   
 b Rolling a number that is not a factor of 6,  $\frac{1}{3}$   
 c Buying a ticket that does not win,  $\frac{999}{1000}$
- 5 26%
- 6 a  $\frac{6}{25}$     b  $\frac{17}{40}$     c  $\frac{67}{200}$     d  $\frac{133}{200}$
- 7 a 73    b 16    c 50  
 d i  $\frac{44}{73}$     ii  $\frac{66}{73}$     iii  $\frac{7}{73}$

- 8 a 70      b 43      c 63  
 d i  $\frac{1}{10}$     ii  $\frac{1}{2}$       iii  $\frac{11}{35}$     iv  $\frac{27}{70}$

9

	Tall	Not tall	
Blond	3	5	8
Not blond	10	12	22
	13	17	30

- 10 a 0.125    b 0.25    c 0.75    d 0.625

- 11 a  $31\frac{1}{4}\%$     b  $33\frac{1}{3}\%$     c 27

### Practice set 3

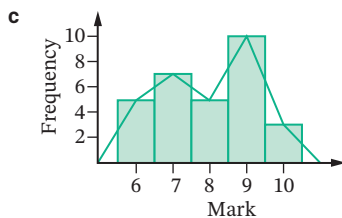
- 1 A and J, C and F, D and G

- 2 a 25%      b 75%      c 75%

3 a

Mark	Tally	Frequency
6		5
7		7
8		5
9		10
10		3

- b 30



- 4 a  $\triangle ABC \equiv \triangle GHI$

- b  $AB = GH$  or  $BC = HI$  or  $AC = GI$ ,  $\angle A = \angle G$  or  $\angle B = \angle H$  or  $\angle C = \angle I$

5 a

Score	Frequency
1	4
2	9
3	8
4	3
5	10
6	6
Total	40

- b

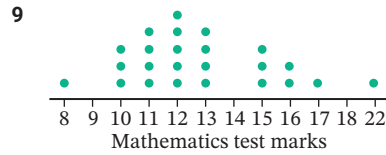
Result of roll of die

1	2	3	4	5	6
---	---	---	---	---	---

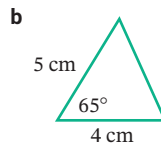
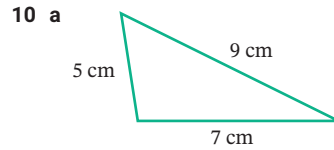
- 6 a numerical    b categorical    c categorical

- 7 a continuous    b continuous    c discrete

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



- a 12      b 12      c 22      d 10-13



- 11 a 92.5    b 90    c 92    d 8

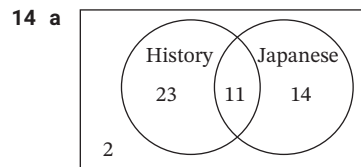
- 12  $\frac{7}{10}$

13 a

x	f	fx
28	6	168
29	1	29
30	6	180
31	2	62
32	3	96
33	2	66
34	4	136
	24	737

- b  $\frac{7}{24}$

- c i 30.7    ii 30    iii 28, 30    iv 6



- b 14      c  $\frac{1}{25}$

- 15 a SSS, SAS, AAS, RHS    b AAS

16 a

	Plays weekend sport	Does not play weekend sport	Total
Male	49	23	72
Female	39	45	84
Total	88	68	156

- b 156      c 88

- d i  $\frac{7}{13}$       ii  $\frac{31}{78}$

	Maths		Science
	3	2	4
	5 5	3	
	8 3	4	0 0 3
	8 8 2	5	4
		6	0 2 9
		7	3
		7	8
		8	8
		9	9

	Median	Range
Maths	50	73
Science	57	64

c Maths, lower median.

18 a  $\frac{3}{64}$       b  $\frac{5}{16}$       c  $\frac{55}{64}$       d  $\frac{37}{64}$

19 a Sample – quick, simple, inexpensive  
b, c, d Teacher to check

## Chapter 10

### SkillCheck

- 1 a 7      b 7      c 8      d 27  
e 6      f 23      g 5      h 3  
i 10      j 5      k 8      l 20
- 2 a -3      b -5      c -12      d -2  
e 3      f -11      g 36      h 3  
i -10      j -8      k -9      l -72
- 3 a 17      b 17      c 4      d 4
- 4 a -6      b 7      c 6      d -14
- 5 a  $n$       b  $11x$       c  $4r$       d  $8t$
- 6 a  $2m + 6$       b  $3x - 6$   
c  $4k + 28$       d  $5d - 5$   
e  $6a - 18$       f  $4b + 32$   
g  $10q - 30$       h  $45j + 9$
- 7 a subtracting      b multiplying  
c dividing      d adding

### Exercise 10.01

- 1 a  $x = 7$       b  $y = 23$       c  $m = 12$   
d  $k = 27$       e  $k = -4$       f  $s = -2$   
g  $n = -13$       h  $p = -20$       i  $m = -8$   
j  $g = 15.5$       k  $a = 10\frac{1}{4}$       l  $k = -7.7$
- 2 a  $t = 51$       b  $w = 11$       c  $a = 7$   
d  $j = 74$       e  $q = 29$       f  $f = 110$   
g  $x = 33$       h  $g = 11$       i  $j = -2$   
j  $w = 7$       k  $m = -15$       l  $d = 0$   
m  $y = 20.9$       n  $n = 8$       o  $b = 1\frac{1}{20}$   
p  $s = 6\frac{5}{6}$
- 3 a  $x = 4$       b  $g = 4$       c  $y = 9$   
d  $b = 9$       e  $d = 9$       f  $c = 9$   
g  $p = 5$       h  $m = 13$       i  $x = -5$   
j  $q = -6$       k  $c = -18$       l  $x = 8$   
m  $p = 9\frac{1}{4}$       n  $r = 2\frac{1}{4}$       o  $q = -3\frac{1}{3}$   
p  $w = -1\frac{1}{3}$

- 4 a  $s = 15$       b  $m = 42$       c  $d = 120$   
d  $w = 58$       e  $a = -12$       f  $f = -18$   
g  $r = -15$       h  $m = -7$       i  $x = 48$   
j  $t = 1\frac{1}{2}$       k  $n = 16$       l  $x = -\frac{1}{2}$
- 5 C      6 Teacher to check.

### Exercise 10.02

- 1 D
- 2 a  $m = 6$       b  $x = 6$       c  $k = 8$   
d  $w = 6$       e  $h = -3$       f  $d = -2\frac{3}{4}$   
g  $x = 7$       h  $a = -1$       i  $c = 2\frac{1}{2}$   
j  $p = 8$       k  $y = 10$       l  $r = 15\frac{1}{2}$
- 3 a  $m = 18$       b  $c = 15$       c  $d = 42$   
d  $k = -27$       e  $h = 20$       f  $x = -24$   
g  $n = 65$       h  $t = 12$       i  $a = -32$   
j  $x = 18$       k  $v = 90$       l  $b = 21$
- 4 D
- 5 a  $x = 6$       b  $x = 9$       c  $x = 12$   
d  $N = 5$       e  $N = 21$       f  $B = -4$   
g  $x = -4$       h  $x = -10$       i  $m = 4\frac{2}{5}$   
j  $x = -24$       k  $x = -1\frac{1}{4}$       l  $x = 15$
- 6 C
- 7 a  $x = 5$       b  $x = 9$       c  $N = 3$   
d  $N = 23$       e  $N = 22$       f  $x = -5$   
g  $k = -5$       h  $m = 31$
- 8 Teacher to check.

### Exercise 10.03

- 1 A      2 C
- 3 a  $a = 6$       b  $k = 4$       c  $x = 3$   
d  $p = 3$       e  $n = 3$       f  $q = 6$   
g  $y = 0$       h  $a = 7$       i  $r = 6$
- 4 D
- 5 a  $a = 3$       b  $x = 2\frac{2}{3}$       c  $d = 1$   
d  $p = 1$       e  $m = 5\frac{1}{4}$       f  $x = 5$   
g  $x = \frac{2}{3}$       h  $r = -1$       i  $y = 4\frac{1}{2}$
- 6 D
- 7 a  $d = -2$       b  $k = \frac{2}{3}$       c  $p = -2$   
d  $x = -3$       e  $k = 2\frac{1}{5}$       f  $m = 5\frac{1}{2}$   
g  $t = 1\frac{1}{2}$       h  $j = -8\frac{1}{2}$       i  $q = -1$
- 8 Teacher to check.

### Exercise 10.04

- 1 a  $x = 1$       b  $m = 4$       c  $k = 6$   
d  $p = 4$       e  $j = 3$       f  $d = 5$   
g  $x = 9$       h  $x = 8$       i  $x = 3$   
j  $x = 8$       k  $k = 12$       l  $q = 20$

- 2 a  $x = 3$       b  $p = -4$       c  $q = -3$   
 d  $h = 11$       e  $r = -8$       f  $e = 11$   
 g  $z = 1$       h  $y = -7$       i  $a = 6$   
 j  $d = -7$       k  $k = 9$       l  $c = 10$
- 3 B
- 4 a  $x = -1$       b  $r = 1$       c  $p = -7$   
 d  $x = -2$       e  $p = 5$       f  $e = 6$   
 g  $y = 1$       h  $a = 4$       i  $w = -6$
- 5 A
- 6 a  $x = 13$       b  $x = 6$       c  $k = -18$   
 d  $y = 2$       e  $v = 4$       f  $x = 11$   
 g  $p = 4$       h  $s = 7$       i  $d = -22$
- 7 Teacher to check.

### Mental skills 10

- 2 a 160      b 70      c 240      d 900  
 e 2600      f 900      g 140      h 300  
 i 180      j 770      k 18      l 34  
 m 46      n 26      o 18      p 12  
 q 40      r 8      s 14      t 24

### Exercise 10.05

- 1 a  $x = \pm 9$       b  $x = \pm 12$       c  $x = \pm 1$   
 d  $x = \pm 13$       e  $m = \pm 71$       f  $u = \pm 43$
- 2 a  $x \approx \pm 3.61$       b  $x \approx \pm 7.35$       c  $x \approx \pm 9.38$   
 d  $t \approx \pm 11.36$       e  $h \approx \pm 30.76$       f  $z \approx \pm 22.96$
- 3 a  $x = \pm\sqrt{41}$       b  $x = \pm\sqrt{30}$   
 c  $x = \pm\sqrt{48}$  or  $\pm 4\sqrt{3}$       d  $a = \pm\sqrt{126}$  or  $\pm 3\sqrt{14}$   
 e  $p = \pm\sqrt{75}$  or  $\pm 5\sqrt{3}$       f  $b = \pm\sqrt{509}$
- 4  $x^2 = 0$ , with solution  $x = 0$
- 5 It is not possible to find the square root of a negative number.
- 6 For example,  $x^2 = -1$  and  $x^2 = -12$
- 7 a positive      b negative      c zero
- 8 a  $x = \pm 3$       b  $x = \pm 4$       c  $x = \pm 5$       d  $x = \pm 2$   
 e  $x = \pm 2$       f  $x = \pm 3$       g  $x = \pm 5$       h  $x = \pm 6$

### Exercise 10.06

- 1 a \$88      b \$1.80      c 33      d 16
- 2 a D, 102      b B, 49      c D, 56  
 d B, 588      e C, \$8974
- 3 a 75      b 49      c 27      d 16  
 e 12      f 18      g 15      h 6
- 4 a 150      b 8      c 100 kg  
 d 6      e 54      f 16 cm
- 5 a  $77^\circ\text{F}$       b  $42\frac{2}{9}^\circ\text{C}$
- 6 a \$600      b 122
- 7 a \$13.90      b 28
- 8 a  $x = 8\frac{1}{2}$       b 17 cm      c  $6\frac{1}{2}$  cm
- 9 a \$2610      b 220
- 10  $x = 7$

### Exercise 10.07

- 1 A
- 2 a 13      b 107
- 3 a 10 hours      b 18 years old
- 4 a 34      b 11      c 13
- 5 a 132      b 6      c 15      d 15
- 6 a  $58\frac{1}{3}$       b 30      c 9
- 7 a \$125      b \$400      c 4% p.a.      d 7 years
- 8 a 3      b 6      c 45      d 15

### Power plus

- 1 a  $x = 3$       b  $x = 2$       c  $x = 0$   
 d  $x = -1$       e  $x = 2\frac{1}{7}$       f  $x = 3\frac{1}{11}$   
 g  $x = 20$       h  $q = 26\frac{2}{3}$
- 2 a  $x = 7$       b  $x = 5$       c  $x = 65$
- 3 a  $x = 5$  or  $-5$       b  $x = 4$  or  $-4$       c  $x = 6$  or  $-6$   
 d  $x = 2$  or  $-2$       e  $x = -7$  or  $-1$       f  $x = 3$  or  $-5$
- 4  $\frac{1}{6}x + \frac{1}{12}x + \frac{1}{7}x + 5 + \frac{1}{2}x + 4 = x$ , 84 years

### Test yourself 10

- 1 a  $k = 7$       b  $x = 11$       c  $a = 14$   
 d  $a = 33$       e  $x = 4$       f  $f = 12$   
 g  $m = 28$       h  $x = 24$       i  $w = -6$   
 j  $k = -2$       k  $m = 8$       l  $x = -36$
- 2 a  $p = 5$       b  $m = -3$       c  $x = 15$   
 d  $h = 77$       e  $n = -8$       f  $a = 60$   
 g  $y = 10$       h  $x = 10$       i  $n = 25$   
 j  $x = -6$       k  $k = 26$       l  $d = -29$
- 3 a  $x = 1$       b  $u = 3$       c  $h = 3$   
 d  $v = -3$       e  $x = 2\frac{3}{5}$       f  $t = 3$
- 4 a  $n = 6$       b  $x = 4$       c  $x = 2$   
 d  $x = 7$       e  $y = 4\frac{2}{3}$       f  $d = 6$   
 g  $r = 21$       h  $a = -2$       i  $n = 3$
- 5 a  $x = \pm 8$       b  $x = \pm 6.7$       c  $x = \pm\sqrt{27}$
- 6 a 5      b 3
- 7 a B      b  $n = 6$
- 8  $x = 3$
- 9 a  $1260^\circ$       b 8

## Chapter 11

### SkillCheck

- 1 a 200      b 180      c 3      d 2500  
 e 3.8      f 0.18      g 180      h 85  
 i 8      j 7.5      k 9150      l 384
- 2 a 6      b 7      c 8
- 3 a 21      b 20      c 2
- 4 a 6      b 8      c 15
- 5 a  $\frac{2}{5}$       b  $\frac{1}{2}$       c  $\frac{4}{5}$       d  $\frac{5}{12}$
- 6 a 8      b 5      c 18      d 30  
 e 760      f 54      g 39      h 250

- 7 a 07:15    b 15:45    c 20:50    d 00:10  
 8 a 4:10 a.m.    b 11:05 a.m.  
    c 2:15 p.m.    d 11:35 p.m.

### Exercise 11.01

- 1 a 6:6 or 1:1    b 2:6 or 1:3    c 6:10 or 3:5  
    d 8:12 or 2:3    e 5:3  
 2 a 12    b 10    c 9    d 20    e 32  
    f 84    g 30    h 75    i 5    j 5  
    k 4    l 1    m 30    n 2    o 40  
    p 5    q 5    r 25  
 3 D  
 4 a 1:10    b 1:2    c 2:5  
    d 5:7    e 3:2    f 7:3  
    g 10:1    h 5:11    i 1:1  
    j 41:107    k 3:1    l 1:16  
    m 2:3:5    n 3:4:6    o 3:1:4  
    p 2:5:3:7  
 5 a 5:6    b 3:4    c 9:8    d 4:3  
    e 4:3    f 8:5    g 5:2    h 4:3  
    i 12:7    j 8:5    k 25:12    l 9:5  
    m 4:7    n 13:8    o 5:3    p 1:2  
    q 3:4    r 3:2    s 1:4    t 1:2  
    u 3:2    v 10:7    w 2:1:3    x 45:10:9  
 6 a 1:4    b 1:4    c 5:49    d 1:4  
    e 1:3    f 4:1    g 5:16    h 1:50  
    i 80:7    j 5:36    k 9:500    l 1:6  
    m 6:1    n 3:20    o 9:40  
 7 3:2  
 8 a 4:3    b 3:4    c 4:7  
 9 a 3:2    b 3:5    c 5:2  
 10 C  
 11 a 16:19    b 19:16    c 3:19    d 19:3  
 12 a 1:1    b 2:1    c 1:2    d 2:1  
 13 a  $\frac{5}{8}$     b 5:3  
 14 A  
 15 Australia 3:250, India 11:500

### Exercise 11.02

- 1 C    2 75    3 560 kg  
 4 32 cm    5 1440    6 17.5 km/h  
 7 a 20 cm    b 136 cm  
 8 50 kg  
 9 a Toudi \$990, Felicity \$540    b \$2250  
 10 D  
 11 a 5 kg    b Heavier packet by 10 c/kg  
 12 25.6 t    13 1.5 m    14 A  
 15 a 7 mL    b 84 mL

### Exercise 11.03

- 1 a 1:500 000    b 1:1000    c 1:50 000 000  
    d 1:2 500 000    e 1:10 000    f 1:200 000  
    g 1:25 000    h 1:40 000    i 1:50 000  
    j 1:10 000

- 2 B  
 3 a 1:20 000  
    b i 1.4 km    ii 1.9 km    iii 2.48 km  
    c i 90 cm    ii 7.5 cm    iii 48 cm  
 4 6670 km    5 66 cm    6 5.6 cm  
 7 a i 880 m    ii 680 m  
    iii 440 m    iv 960 m  
    b i 880 m    ii 440 m  
    c 360 m    d 120 m by 280 m  
    e 160 m    f 20 cm, Teacher to check  
 8 a 3.9 m    b 77 cm    c 2.0 m  
    d 1.2 m    e 1.6 m  
    f  $3.9 \text{ m} \times 2.9 \text{ m} = 11.31 \text{ m}^2$   
 9 a 12.6 cm    b 7.2 m  
    c 13.5 cm    d 67.2 cm  
 10 a 5.0 m    b 2.5 m  
    c 2.0 m    d  $2.0 \text{ m} \times 2.5 \text{ m} = 5 \text{ m}^2$   
    e 5.0 m    f  $4.1 \text{ m} \times 3.8 \text{ m} = 15.58 \text{ m}^2$   
 11 B  
 12 a 0.45 mm    b 11 mm  
    c 26.25 mm    d 0.37 mm

### Mental skills 11

- 2 a 8:45 a.m.    b 1:20 p.m.    c 5:50 p.m.  
    d 12:17 a.m.    e 9:05 p.m.    f 6:32 p.m.  
    g 11:15 a.m.    h 2:38 a.m.    i 2:40 p.m.  
    j 3:20 a.m.    k 4:55 p.m.    l 11:31 p.m.  
    m 1:08 a.m.    n 10:18 a.m.    o 8 p.m.  
    p 6:43 a.m.  
 4 a 18:35    b 08:05    c 11:45    d 23:20  
    e 02:21    f 12:30    g 15:48    h 19:11  
    i 09:08    j 21:50    k 00:42    l 07:39  
    m 01:59    n 22:18    o 10:46    p 17:23

### Exercise 11.04

- 1 a 9    b 5    c 7    d 13  
 2 a \$400, \$100    b \$350, \$150  
 3 a 1:1:2  
    b Phuong \$1000, Janelle \$1000, Ahmet \$2000  
 4 \$180  
 5 a 200 kg, 250 kg    b 270 kg, 180 kg  
 6 a 80 cm, 240 cm, 400 cm  
    b 300 cm, 180 cm, 240 cm  
 7 D    8 125    9 25  
 10 600 g    11 1078    12 C  
 13 80 kg    14 568  
 15 4 m, 6 m, 10 m  
 16 240 kg  
 17 a 30 000    b 165 000  
 18 \$140 000, \$70 000

### Exercise 11.05

- 1 a words/min    b beats/min    c c/min  
    d \$/kg    e \$/h    f m/s or km/h  
    g persons/year    h c/kL    i persons/km<sup>2</sup>

- 2 a 17 sheep/h                      b \$4.30/kg  
 c 26 students/teacher            d 34 points/game  
 e 91 words/min                    f 8.5 articles/h  
 g 5.1 cars/day                     h 630 boxes/h  
 i 37 m/s                             j 920 bottles/h  
 k 1324 revolutions/min        l \$35/h  
 m 56 km/h                         n \$2.75/kg  
 o 4.75 runs/over                p 8.1 km/L  
 q \$10.50/h                        r 42 kg/ha
- 3 B
- 4 a Can travel 100 km in one hour at this speed.  
 b 150 cars will pass in an hour at this rate.  
 c 10.3 L can be used over a distance of 100 km.  
 d For each hectare of land, there are 60 sheep.
- 5 80 kg/person                    6 1800 ha/year  
 7 139 c/L                         8 182.5

### Exercise 11.06

- 1 a 2 kg box                    b 8 notepads            c 150 g  
 d 7 tubs                      e 3 kg                    f 2.25 L carton
- 2 Kim                         3 750 g box            4 C
- 5 a 375 g    b 2 L            c 735 g            d 115 g
- 6 a medium    b large            c small            d large

### Exercise 11.07

- 1 \$676.40                    2 160 runs
- 3 a 10.5 km/L                b 210 km
- 4 336                         5 432 mL                6 6
- 7 \$3980                     8  $7\frac{1}{7}$  ha or 7.1 ha
- 9 a \$70                      b 2.5 h
- 10 300 km
- 11 a 14.8 L                    b 133.2 km
- 12 C
- 13 a 17°C, 29°C            b 12 p.m.
- 14 a 2400 m<sup>2</sup>                b 40 m<sup>2</sup>/min  
 c 60 m<sup>2</sup>/min                d 24 min (at 100 m<sup>2</sup>/min)
- 15 a 5400 s                    b 90 min                c 1.5 hr
- 16 a 650 km                    b 48 L                    c 13.5 km

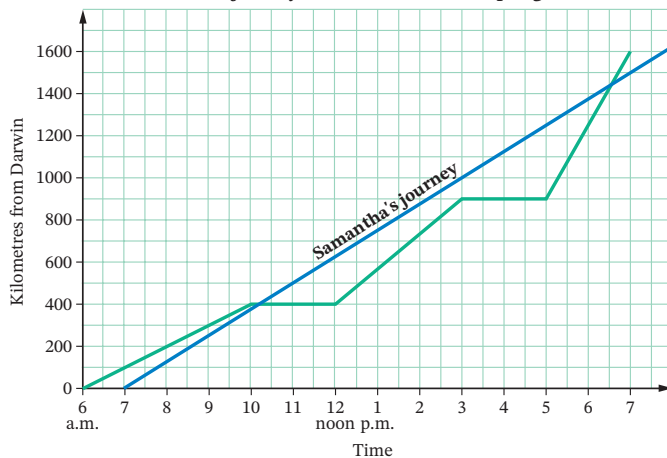
### Exercise 11.08

- 1 a 5 km/h                    b 480 km/h            c 5 km/h  
 d 17 km/h                    e 100 km/h            f 80 km/h  
 g 120 km/h                    h 120 km/h            i 200 km/h  
 j 9 km/h                      k 36 km/h              l 6 km/h
- 2 a 10 m/s                    b 1.5625 m/s            c 58 m/s  
 d 8 m/s                      e 1.5 m/s
- 3 a 720 km                    b 30 km                c 1330 km
- 4 3 km                         5 B
- 6 a 100 m/min                b 6 km/h
- 7 40 km/h                    8 D                      9 1200
- 10 1.5 h                      11 Teacher to check.
- 12 63.9 km/h                13 56 km/h
- 14 54.05 s                    15 500 m

### Exercise 11.09

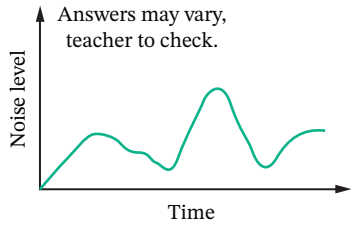
- 1 a 4 h                         b 8 km  
 c i  $3\frac{1}{3}$  km/h                ii 3 km/h  
 d steeper graph            e 16 km  
 f 11:30 a.m. to 1 p.m., 2 p.m. to 3 p.m.  
 g 3 p.m.                      h 1 h
- 2 a 300 km                    b 4 h  
 c 1 h                         d 100 km/h  
 e 100 km                    f Neither: the same speed.
- 3 a i 2 p.m.                    ii 11 a.m.  
 b 12:45 p.m.                c 48 km                d 4.5 h  
 e i 16 km/h                    ii 6.4 km/h  
 iii 9.6 km/h                iv 9.6 km/h
- 4 a 240 km  
 b Sam, steeper graph, ending journey earlier.  
 c 120 km                      d 180 km  
 e 10 a.m., 160 km  
 f After 9:15 a.m., graph is steeper.  
 g 40 km/h                    h B
- 5 a 1600 km                    b 7 p.m.  
 c 350 km/h                    d D  
 e see below  
 f 10:10 a.m.

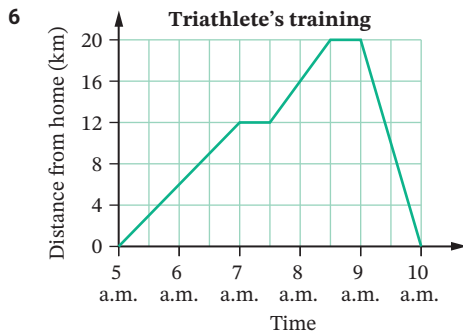
James' journey from Darwin to Alice Springs



- 6 Teacher to check.  
 7 a A      b B      c D      d C  
 8 C, not possible to be at 2 different places/distances at the same time.

### Exercise 11.10

- 1   
 2 B  
 3 a 8 Brown      b 8 Yellow  
   c 8 Red      d 8 Green  
 4 Teacher to check.  
 5 a Grew steadily, then dropped.  
   b 4  
   c Returns to normal.  
   d His team was losing and it was a close match.  
   Answers may vary, teacher to check.



- 7 B      8 Teacher to check.

### Exercise 11.11

- 1 A  
 2 a 1 h 55 min    b 50 min      c 4 h 45 min  
   d 3 h 55 min    e 5 h 45 min    f 10 h 55 min  
   g 8 h 5 min      h 3 h 30 min    i 4 h 40 min  
 3 a 6 h 47 min    b 11 h 52 min    c 3 h 29 min  
   d 7 h 31 min    e 12 h 30 min    f 8 h 9 min  
   g 6 h 9 min      h 1 h 45 min    i 12 h 29 min  
   j 12 h 7 min     k 4 h 51 min    l 1 h 43 min  
 4 1 h 55 min  
 5 a 7 h      b 6 h 30      c 4 h 11 min  
   d 1 h, 1 h 15 min, faster trip due to less traffic earlier in the day.  
   e 10:41 a.m.    f Strathfield  
   g 35 min, 4:40 p.m.  
 6 a 8 p.m.      b 1 p.m.      c 7:35 p.m.  
   d 1:17 p.m.    e 2:04 a.m.    f 2:32 p.m.  
   g 3:17 a.m.    h 4:25 p.m.    i 8:45 a.m.  
   j 3:10 p.m.

- 7 Volvo 1:43 p.m., Peugeot 2:02 p.m., Ford 2:04 p.m., Subaru 2:19 p.m., Nissan 2:21 p.m., Toyota 2:41 p.m.  
 8 a 6      b 8:15 a.m.  
   c Central (RSL) or Pine Ave.  
   d 9:10 a.m.    e 20 min  
   f 6:50 p.m.    g 11:40 a.m.

### Exercise 11.12

- 1 a ahead    b behind    c behind    d ahead  
   e ahead    f behind    g ahead    h ahead  
   i ahead    j ahead    k behind    l behind  
 2 a 10 p.m.    b 8 p.m.    c 7 a.m.    d 8 p.m.  
   e 4 a.m.    f 2 a.m.    g 3 p.m.    h 1 p.m.  
 3 a 2 h      b 2 h      c 20 h      d 7 h  
   e 15 h     f 0 h      g 3 h      h 13 h  
   i 7 h      j 9 h  
 4 a 11 a.m.    b 7 p.m.    c 6 a.m.    d 7 p.m.  
   e 3 a.m.    f 1 a.m.    g 2 p.m.    h 12 noon  
 5 11 a.m.    6 8 p.m.  
 7 B      8 Teacher to check.  
 9 a ahead      b ahead      c same  
   d behind     e ahead      f behind  
   g ahead      h same      i ahead  
 10 a  $\frac{1}{2}$  h      b 2 h      c  $\frac{1}{2}$  h  
   d  $\frac{1}{2}$  h      e 2 h      f 0 h  
 11 a 11 a.m.    b 10:30 a.m.    c 9 a.m.  
   d 10:30 a.m.    e 11 a.m.      f 11 a.m.  
 12 a 9 p.m.      b 9 p.m.      c 7 p.m.  
   d 8:30 p.m.    e 9 p.m.      f 9 p.m.  
 13 a 3 p.m.      b 7 p.m.  
 14 a, b, c Teacher to check      d 9 p.m.

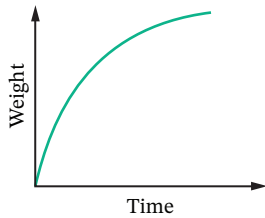
### Power plus

- 1 332 740  
 2 a 704 km<sup>2</sup>      b 63 071 683 000  
 3 Teacher to check.  
 4 a 97.2 km/h      b 349.2 km/h  
   c 11.88 km/h     d 82.8 km/h  
 5  $y = 3.6x$

### Test yourself 11

- 1 a 4:12    b 6:15    c 9:21  
   d 20:45    e 2:3.2    f 15:20:25  
 2 a 4:7      b 1:3      c 1:6      d 5:9  
   e 3:1:4    f 1:5:20    g 2:3      h 4:3  
   i 3:5      j 4:1      k 1:4      l 65:4  
   m 25:1    n 50:9    o 100:17    p 3:8  
   q 2:7      r 1:9  
 3 a 100      b \$45 000  
 4 a 67 cm    b 12 cm  
 5 a 1:25 000  
   b i 625 m      ii 1.1 km or 1100 m  
   c i 3.5 cm      ii 10 cm  
 6 B

- 7 a \$3.50/kg                      b 110 km/h  
 c \$14.10/h                      d 5.2 runs/over
- 8 a 1 kg box                      b 350 g can  
 c 1.5 L bottle                    d 500 g bar
- 9 a \$19.95    b \$710.60    c 29.6 L    d 7.2 ha
- 10 20 km/h                      11 247.5 km
- 12 a 10 km    b 3            c  $2\frac{2}{3}$  km/h  
 d  $3\frac{1}{2}$  h      e 2:30 p.m. to 3:30 p.m.
- 13 a B            b C            c A



- 15 a 11:25 p.m.    b 6:30 p.m.
- 16 a 8 h 30 min    b 15 h 15 min    c 10 h 50 min
- 17 a p.m. time    b 4              c 9 min  
 d Horatio St    e 2:50 p.m.
- 18 a 8 h            b 2 h            c 18 h            d 10 h
- 19 11:30 p.m.

## Chapter 12

### SkillCheck

- 1 a 4                      b 5                      c 2  
 d 2                      e 4                      f 5
- 2 a 4                      b 6                      c -3  
 d 1                      e -3                      f 7
- 3 a  $x = 3$               b  $x = -2$               c  $x = -3$   
 d  $x = -2$               e  $x = -1\frac{1}{2}$               f  $x = 3$

### Exercise 12.01

- 1 a 2, 6, -2, -9, 4              b 24, -9, 6, 30, -12  
 c 4, -1, -3, 0,  $3\frac{1}{2}$               d 5, 14, 7, 20, -2  
 e 16, -2, 0, 8, 4              f -7, 4, 2, -11, 8
- 2 A
- 3 a 14, 4, 19, 39, -31              b 10, -5, 28, 4, -20  
 c 6, -6, 42, -14, 22              d 22, 37, -23, 32, -8  
 e -3, -1, 1, 3, 5, 7              f  $-3, -2\frac{1}{2}, -2, -1\frac{1}{2}, -1, -\frac{1}{2}$   
 g 2, 5, 8, 11, 14, 17              h 3, 2, 1, 0, -1, -2
- 4 B                      5 D

### Exercise 12.02

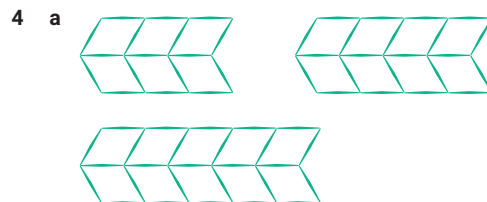
- 1 a  $y = 3x$               b  $y = -2x$               c  $y = x + 4$   
 d  $y = x - 4$               e  $y = 10 - x$               f  $y = x \div 2$   
 g  $k = p + 4$               h  $y = x - 3$               i  $j = 2h$   
 j  $p = m \div 5$
- 2 a  $h = 3f - 2$ , 19, 22    b  $p = 5m - 3$ , 27, 42  
 c  $b = 3m + 3$ , 18, 27    d  $k = 2h + 2$ , 20, 24

- e  $s = 3r + 1$ , 13, 22    f  $b = 2a - 2$ , 18, 20  
 g  $n = 3m + 5$ , 20, 23    h  $d = 10c + 1$ , 91, 101  
 i  $x = 5w - 1$ , 34, 39    j  $z = 2y - 6$ , 12, 14  
 k  $m = 4a + 1$ , 29, 37    l  $t = 2z - 7$ , 11, 17
- 3 B                      4 C
- 5 a  $y = -2x - 1$ , -19    b  $c = \frac{1}{2}A$ , 5  
 c  $t = -5s + 13$ , -22    d  $v = -10t + 20$ , 0, -30  
 e  $D = -\frac{1}{2}x - \frac{1}{2}$ , -2,  $-3\frac{1}{2}$

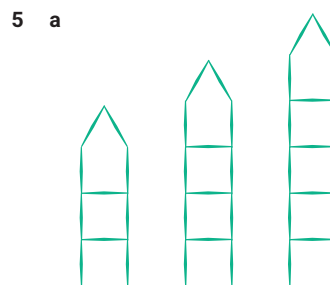
### Exercise 12.03

- 1 B
- 2 a i 15                      ii  $T = 2n - 1$                       iii 15, 39  
 b i 16                      ii  $T = 2n$                       iii 16, 40  
 c i 22                      ii  $T = 2n + 6$                       iii 22, 46  
 d i 28                      ii  $T = 3n + 4$                       iii 28, 64  
 e i 63                      ii  $T = 8n - 1$                       iii 63, 159  
 f i 37                      ii  $T = 5n - 3$                       iii 37, 97  
 g i 5                      ii  $T = -2n + 21$                       iii 5, -19  
 h i 64                      ii  $T = n^2$                       iii 64, 400
- 3 a
- 


- b 7, 10, 13, 16, 25, 34
- c The number of tiles equals 3 times the arm length plus 1.
- d  $t = 3a + 1$
- e i 46                      ii 100

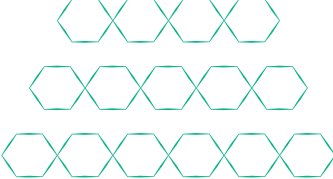


- b 12, 17, 22, 32, 47, 52
- c The number of toothpicks equals 5 times the number of the flight shape plus 2.
- d  $t = 5f + 2$
- e i 127                      ii 202




- b 5, 8, 11, 14, 17, 26, 35  
 c The number of toothpicks equals 3 times the number of stages plus 2.  
 d  $t = 3s + 2$

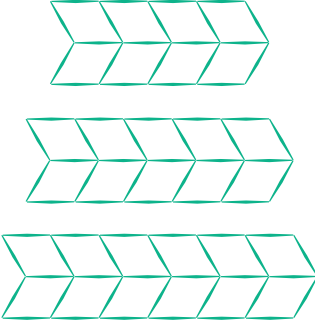
6 e i 38 ii 137  
 a i   
 ii 4, 8, 12, 16, 20 iii  $T = 4n$  iv 48

b i 

- ii 6, 12, 18, 24, 30 iii  $T = 6n$  iv 72

c i 

- ii 4, 7, 10, 13, 16 iii  $T = 3n + 1$  iv 37

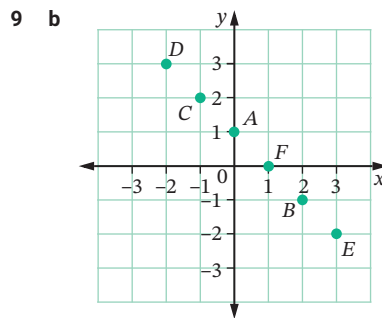
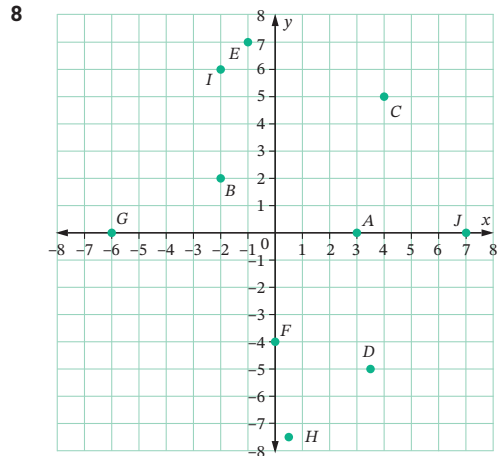
d i 

- ii 6, 10, 14, 18, 22 iii  $T = 4n + 2$  iv 50

- 7 A  
 8 a i 6 ii 8 iii 10 iv 26  
 b  $C = 2T + 2$  c 102 d 14  
 9 a i 8 ii 11 iii 14 iv 32  
 b  $n = 3d + 2$  c 56 d 9

### Exercise 12.04

- 1 a P b N c K d T e M  
 f S g Q h R i L j U  
 2 a (4, 1) b (-2, 4) c (-3, -2) d (1, -3)  
 e (4, 4) f (-5, 0) g (0, 1) h (0, -2)  
 i (5, 0) j (3, -4)  
 3 a 2nd b 4th c 1st  
 d 2nd e 3rd  
 4  $F(-5, 0)$ ,  $R(-1\frac{1}{2}, 0)$ ,  $O(0, 0)$ ,  $Q(2, 0)$ ,  $I(5, 0)$   
 5  $M(0, 3)$ ,  $G(0, 1)$ ,  $O(0, 0)$ ,  $H(0, -2)$ ,  $S(0, -4)$   
 6 D  
 7 a 4th b 3rd c 2nd d 1st

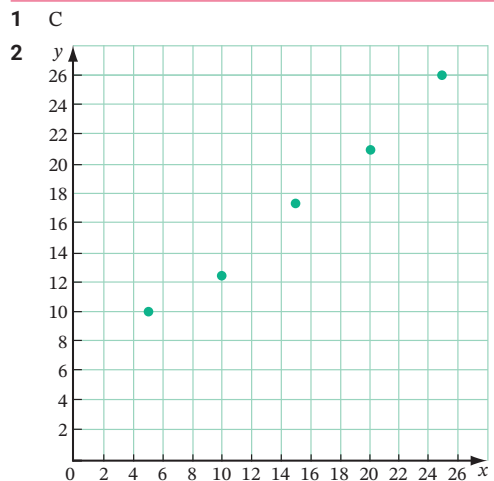


- c They all lie on the same line.  
 d Teacher to check.

### Mental skills 12

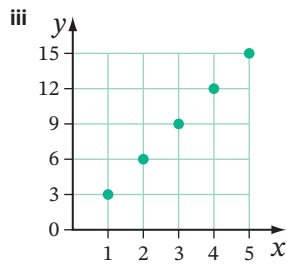
- 2 a \$700 b \$800 c 400 d 700  
 e \$300 f \$400 g 250 h \$300  
 i \$300 j 500

### Exercise 12.05

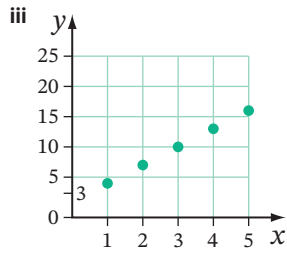


There is a rough linear pattern but it is not perfect.

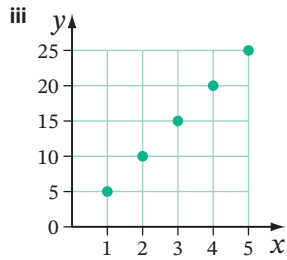
3 a i 3, 6, 9, 12, 15    ii  $y = 3x$



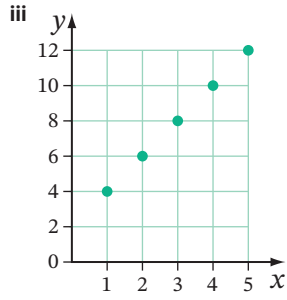
b i 4, 7, 10, 13, 16    ii  $y = 3x + 1$



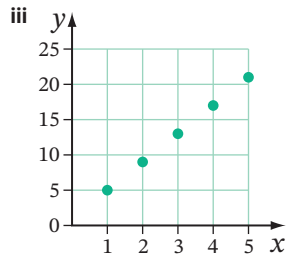
c i 5, 10, 15, 20, 25    ii  $y = 5x$



d i 4, 6, 8, 10, 12    ii  $y = 2x + 2$

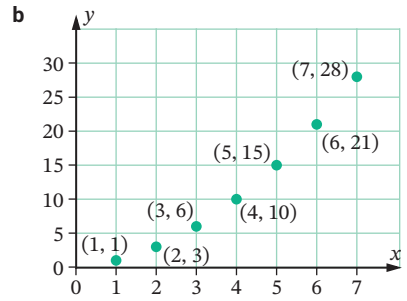


e i 5, 9, 13, 17, 21    ii  $y = 4x + 1$



4 Yes

5 a 1, 3, 6, 10, 15, 21, 28



c No    d C

6 a

S	1	2	3	4	5	6
B	1	5	9	13	17	21

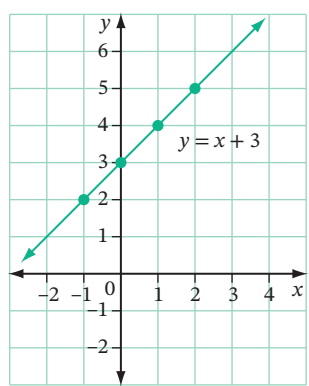
b  $B = 4S - 3$

c i 37    ii 93

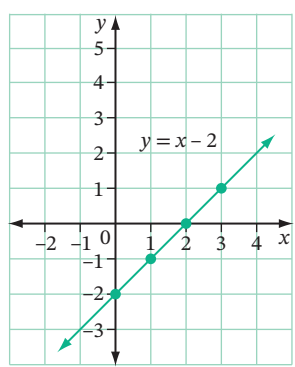
d 27

**Exercise 12.06**

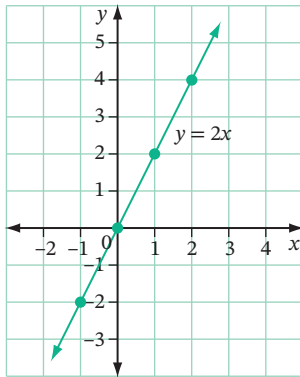
1 a 2, 3, 4, 5



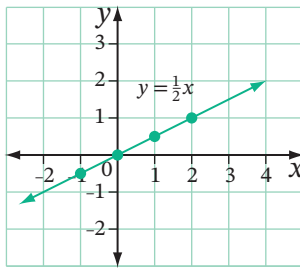
b -2, -1, 0, 1



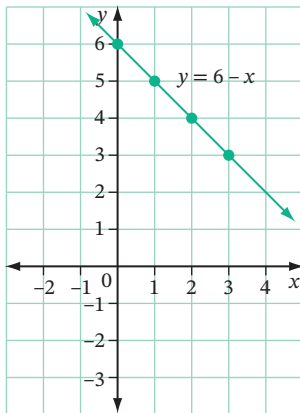
c  $-2, 0, 2, 4$



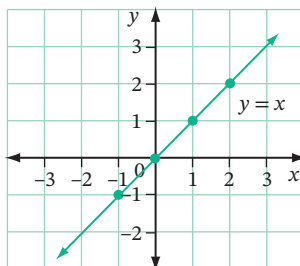
d  $-\frac{1}{2}, 0, \frac{1}{2}, 1$



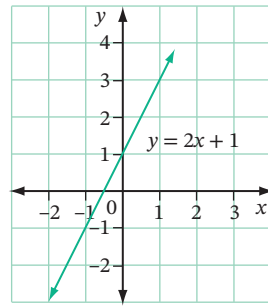
e  $6, 5, 4, 3$



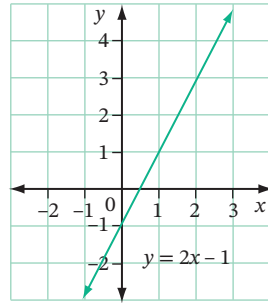
f  $-1, 0, 1, 2$



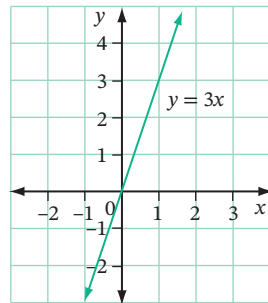
2 a



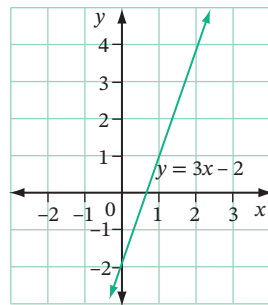
b



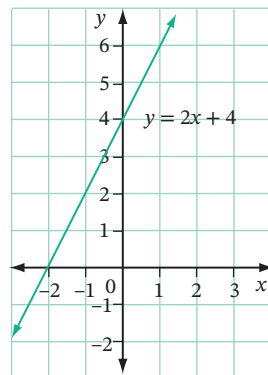
c

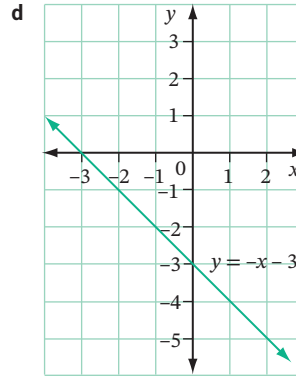
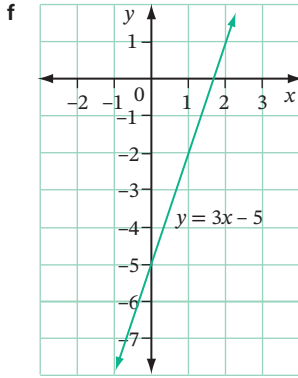


d

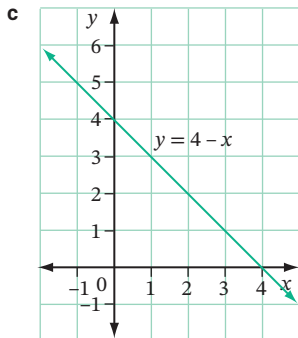
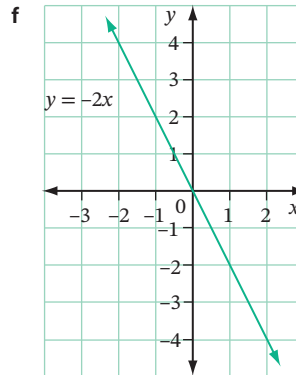
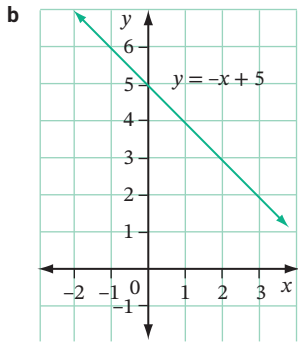
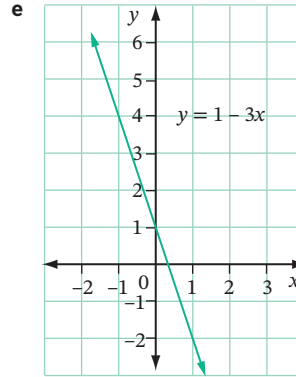
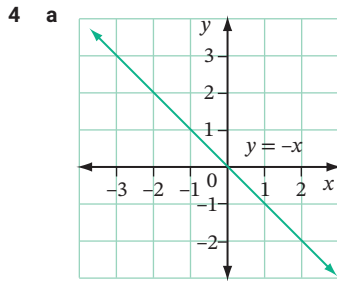


e





3 From left to right, the line is rising, going up.



5 From left to right, the line is falling, going down.

6 a increasing    b increasing    c decreasing

d increasing    e decreasing    f decreasing

7 a yes    b no    c yes

d yes    e yes    f no

8 D

### Exercise 12.07

1 D

2 a  $-4, -3, -2, -1, y = x - 3$

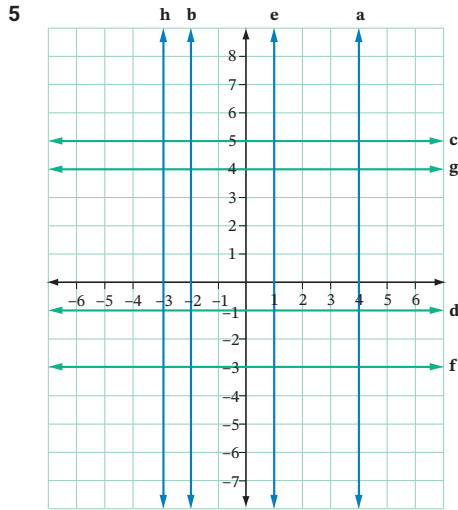
b  $-4, -3, -2, -1, y = x - 2$

c  $-2, 0, 2, 4, y = 2x$

d  $0, \frac{1}{2}, 1, 1\frac{1}{2}, y = \frac{1}{2}x$

e  $1, 0, -1, -2, y = -x$

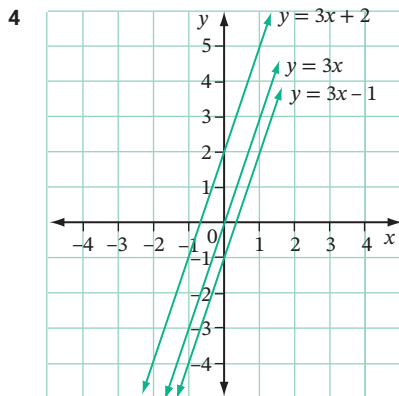
- f 5, 4, 3, 2,  $y = 2 - x$   
 g -3, -1, 1, 3,  $y = 2x - 1$   
 h 1,  $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$ ,  $y = \frac{1}{2}x + 2$
- 3 a They are all vertical lines  
 b They are all horizontal lines
- 4 a  $y = 6$       b  $x = -4$       c  $y = 3$   
 d  $x = 5$       e  $y = -5$       f  $x = 3$   
 g  $y = -3$       h  $x = -1$



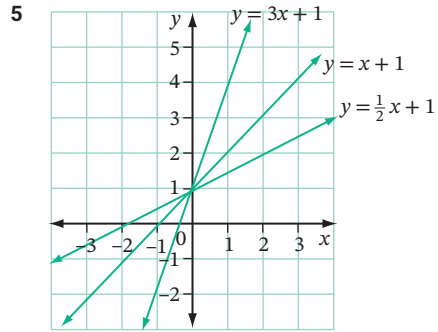
- 6 B      7  $y = \frac{1}{2}x + 2$

### Exercise 12.08

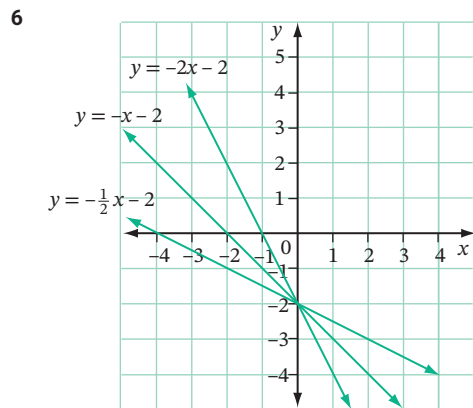
- 1 a 4, 1      b  $\frac{1}{2}, -3$       c 1, -5      d -1, 6
- 2 a point in the same direction, parallel  
 b coefficient of  $x$  is 1  
 c different  $y$ -intercepts  
 d different constant terms
- 3 a all pass through (0, 0),  $y$ -intercept of 0  
 b constant term of 0  
 c point in different directions  
 d different coefficients of  $x$   
 e  $y = 3x, 3$       f  $y = \frac{1}{4}x, \frac{1}{4}$   
 g The greater the size of the coefficient, the steeper the line.



- a parallel      b coefficient of  $x$  is 3  
 c  $y$ -intercepts      d constant terms



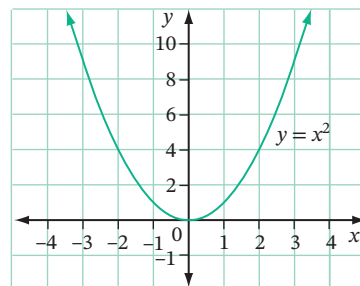
- a  $y$ -intercept of 1  
 b constant term of 1  
 c different steepnesses, directions  
 d coefficients of  $x$   
 e 3



- a  $y$ -intercept of -2  
 b constant term of -2  
 c different steepnesses, directions  
 d decreasing lines, pointing downwards  
 e  $-\frac{1}{2}$

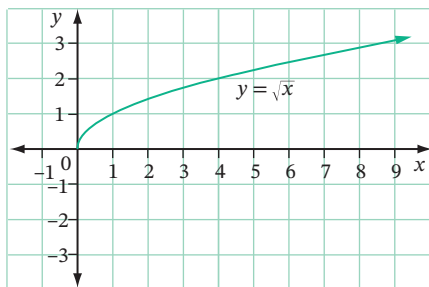
- 7 the sign of the coefficients of  $x$       8 B  
 9 a coefficient of  $x$       b  $y$ -intercept  
 c decreasing      d constant term  
 e negative

- 10 a 9, 4, 1, 0, 1, 4, 9

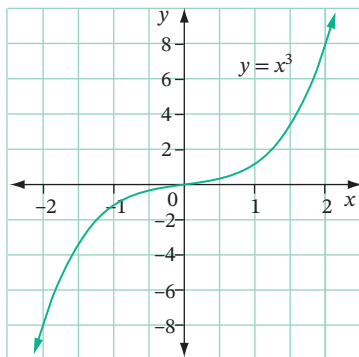


**b** 0, 1, 1.41, 2, 2.24, 2.65, 3

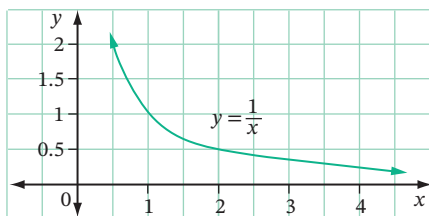
$y = \sqrt{x}$



**c** -8, -3.375, -1, -0.125, 0, 0.125, 1, 3.375, 8



**d** 2, 1, 0.6, 0.5, 0.4, 0.3, 0.29, 0.25, 0.2



- 11 a** Their graphs are not lines, but curves.  
**b**  $x$  is raised to a power, or square root of  $x$ , or appears in the denominator of a fraction.

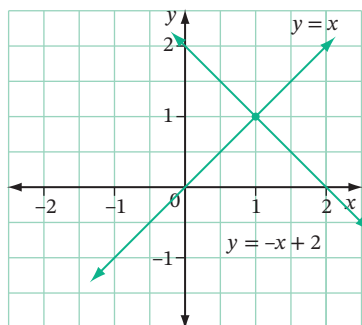
### Exercise 12.09

- |                       |                             |                             |
|-----------------------|-----------------------------|-----------------------------|
| <b>1 a</b> $x = 3$    | <b>b</b> $x = -2$           | <b>c</b> $x = 1\frac{1}{2}$ |
| <b>2, 3 a</b> $x = 3$ | <b>b</b> $x = 4\frac{1}{2}$ | <b>c</b> $x = -3$           |
| <b>4 a</b> $x = -2$   | <b>b</b> $x = 0$            | <b>c</b> $x = 2\frac{1}{2}$ |
| <b>5 a</b> $x = 3$    | <b>b</b> $x = -3$           | <b>c</b> $x = 0$            |
| <b>6 a</b> $x = 4$    | <b>b</b> $x = -3$           | <b>c</b> $x = 2$            |
| <b>7 a</b> $x = 4$    | <b>b</b> $x = -\frac{1}{2}$ | <b>c</b> $x = -2$           |
| <b>8 a</b> $x = 4$    | <b>b</b> $x = -4$           | <b>c</b> $x = -2$           |

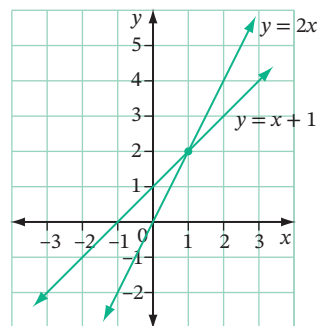
### Exercise 12.10

**1** B

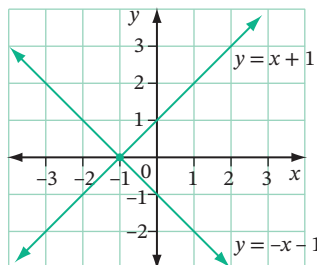
**2 a** (1, 1)



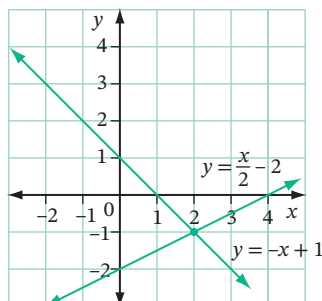
**b** (1, 2)



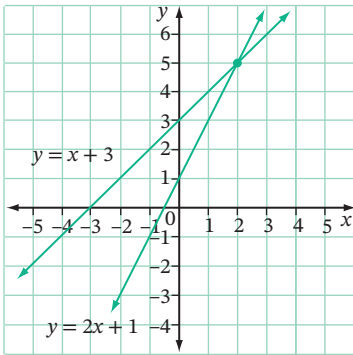
**c** (-1, 0)



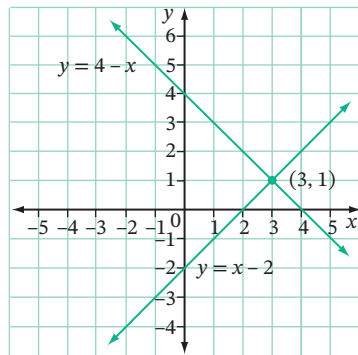
**d** (2, -1)



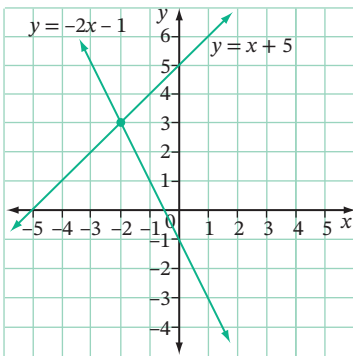
e (2, 5)



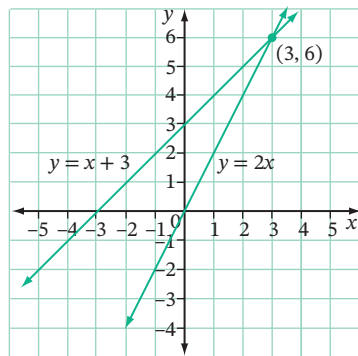
c  $x = 3$



f (-2, 3)

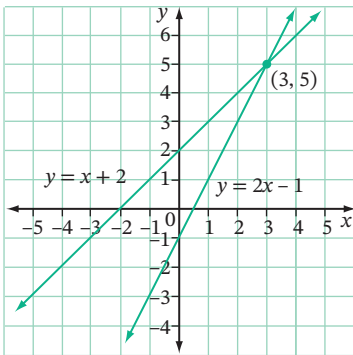


d  $x = 3$

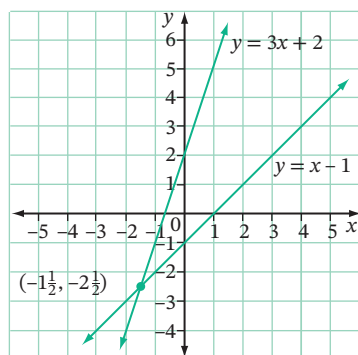


3 B

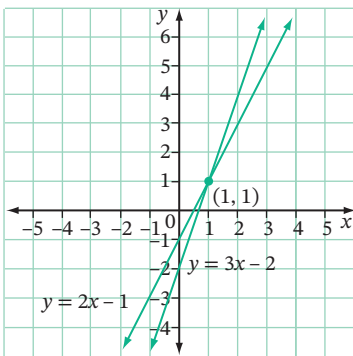
4, 5a  $x = 3$



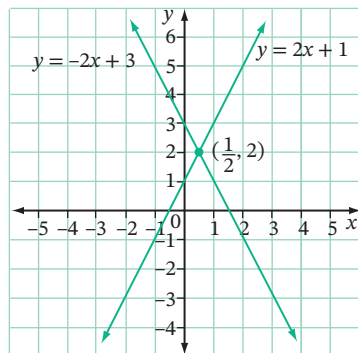
e  $x = -1\frac{1}{2}$



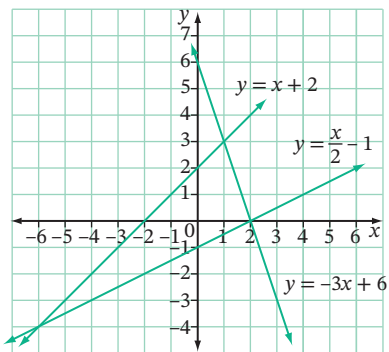
b  $x = 1$



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

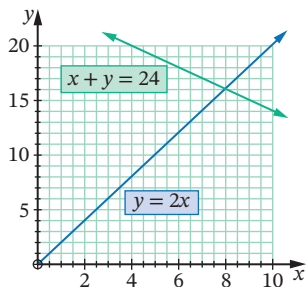


- 6 (1, 3), (2, 0), (-6, -4)



### Power plus

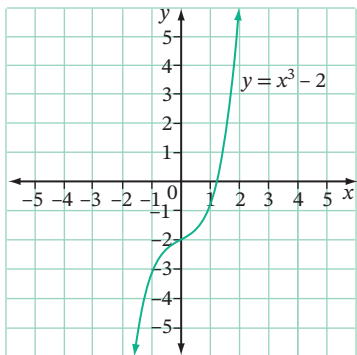
- 1 a, c



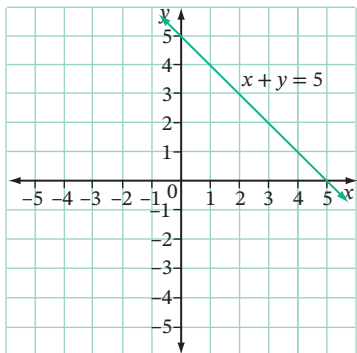
b  $x + y = 24$

d George \$16, Bill \$8

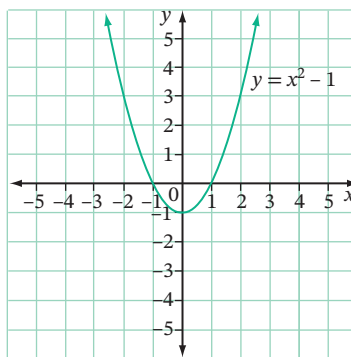
- 2 a non-linear



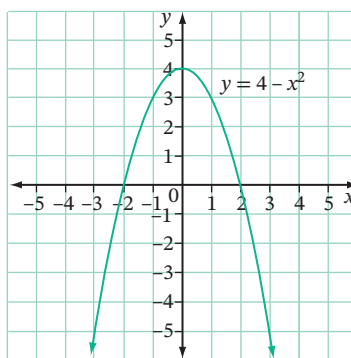
- b linear



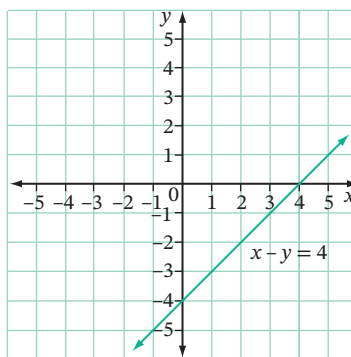
- c non-linear



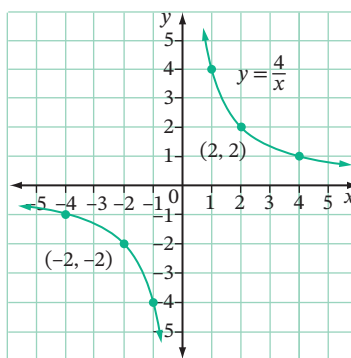
- d non-linear



- e linear

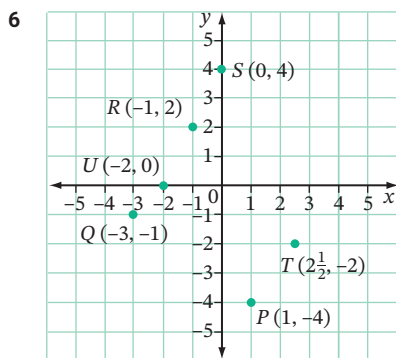


- f non-linear

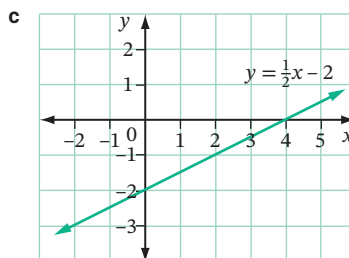
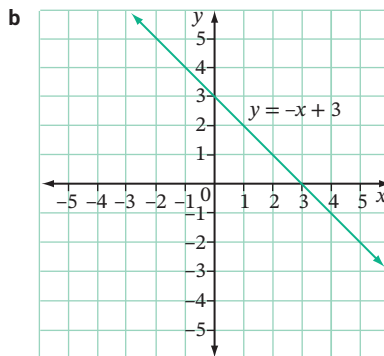
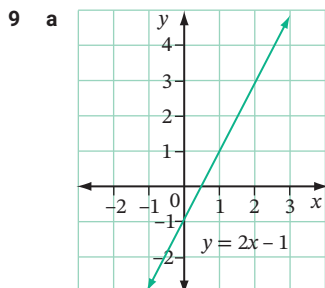
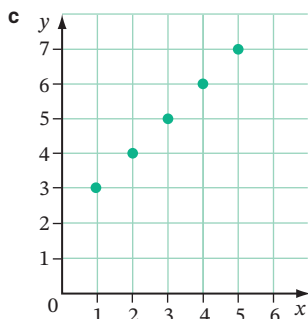


## Test yourself 12

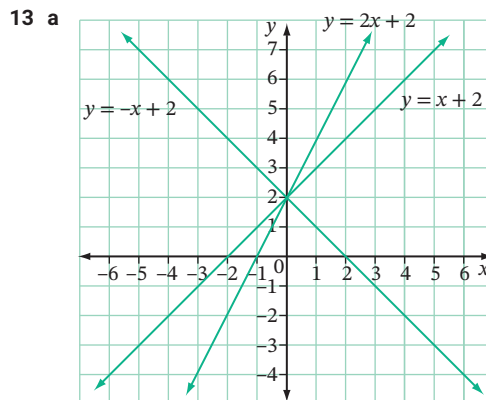
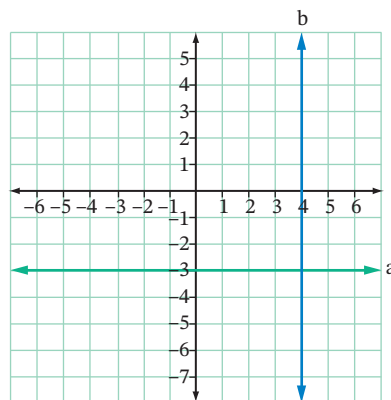
- 1 a 2, 3, 4, 5, 6      b -11, -9, -7, -5, -3  
 c 6, 5, 4, 3, 2
- 2 a  $y = x - 2$       b  $p = 3m - 1$   
 c  $n = -2m + 10$
- 3 a 30      b  $T = 4n + 2$
- 4 a 4, 7, 10, 13, 16, 25, 31  
 b Number of matchsticks equals 3 times the number of rhombuses plus 1.  
 c  $y = 3x + 1$   
 d i 37      ii 46
- 5 A(0, 5), B(3, 1), C(-4, -3), D(-2, 4)



- 7 a S      b R      c U      d T and P
- 8 a 3, 4, 5, 6, 7      b  $y = x + 2$



- 10 a No      b No      c Yes      d Yes
- 11 a  $y = x + 3$       b  $y = -2x - 1$
- 12

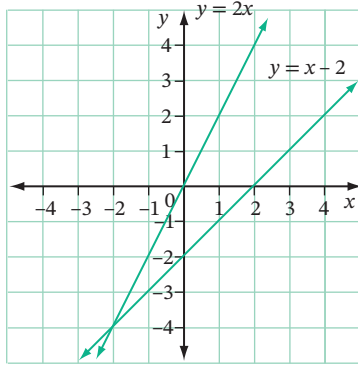


- b y-intercept of 2  
 c constant term of 2  
 d different steepnesses, directions and coefficients of x

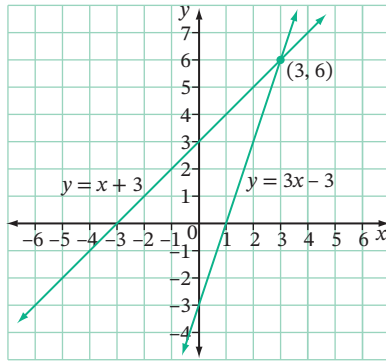
14 a  $x = 3$

b  $x = -1\frac{1}{2}$

15  $(-2, -4)$



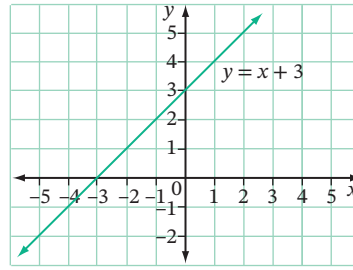
16  $x = 3$



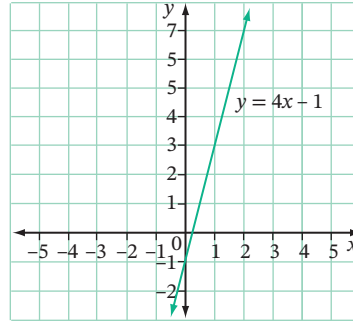
### Practice set 4

- 1 a  $a = 1$       b  $m = 3$       c  $x = -5$   
 d  $t = 18$       e  $k = 77$       f  $x = 2$   
 g  $x = 9$       h  $x = -8$       i  $a = 15$
- 2 a 1 : 3      b 48 : 17      c 40 : 3  
 d 1 : 12      e 6 : 5      f 1 : 4
- 3 a 300 g for \$5.20      b 1.5 kg for \$3.30
- 4 7, 9, 11, 13, 15      5 D
- 6 a  $q = 6$       b  $x = 3$
- 7 a  $y = 2$       b  $d = 10$
- 8 a 5 h 25 min      b 7 h 5 min
- 9 20
- 10 a 25 cm      b 20 m
- 11 1 kg
- 12 a 33 km/h      b 225 km
- 13  $y = 3x$
- 14 a 5, 7, 9, 11, 17  
 b The number of toothpicks is equal to the double the number of triangles plus 1.  
 c  $p = 2t + 1$       d 41
- 15  $A(2, 3), B(4, 5), C(-2, 4), D(0, -5), E(-3, -2), F(1, 0), G(-1, -3)$ .

16 a 2, 3, 4, 5



b  $-5, -1, 3, 7$



17  $h = 12$

18 1.5 t

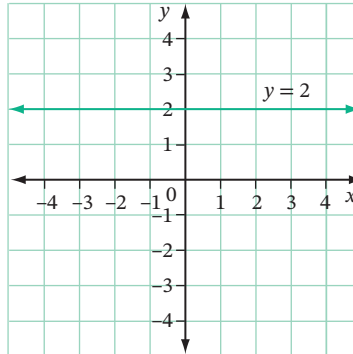
19 440 km

20 a No

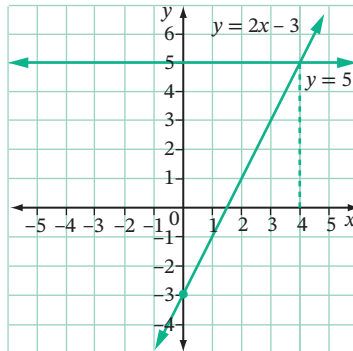
b Yes

21 50 h

22

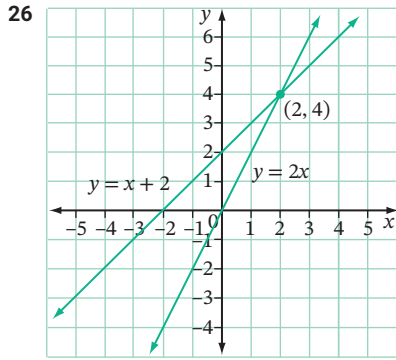


23  $x = 4$



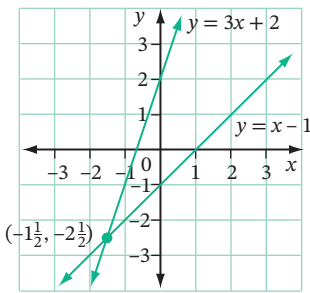
24  $y = x + 2$

25 12 midnight



- 27 a 1 p.m., for 1.5 hours      b 26 km  
c 6.5 km/h

28  $x = -1\frac{1}{2}$



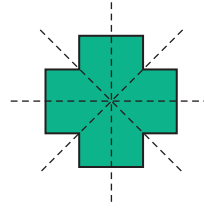
- 29  $x = -2$       30 B  
31 a Dounya 2.9 m/s, Anna 2.7 m/s  
b Dounya by 51.1 seconds

## General Practice

- 1 a 13      b 16      c 17  
d 3      e 5      f 18
- 2 a  $2x + y$       b  $yz - x$   
c  $x + y + z$       d  $xy - 4z$
- 3 a  $\frac{1}{4}$       b  $\frac{3}{4}$       c  $\frac{7}{20}$
- 4 a  $7\frac{1}{5}$       b  $6\frac{7}{10}$       c  $6\frac{1}{6}$
- 5 a -6      b 4      c 5
- 6 a  $6ar$       b  $-3p$       c  $35u^2$   
d  $5x + 9$       e  $8p - 7q$       f  $\frac{6u}{m}$
- 7 25%
- 8 a 30m/s      b 16.4 points/game  
c \$8/kg
- 9 a 4.8      b 5      c 5      d 7
- 10 a  $m = 34$  (angle sum of a triangle)  
b  $m = 45$  (angles on a straight line)  
c  $y = 68$  (angle sum of a triangle)  
d  $m = 100$  (isosceles triangle, exterior angle of a triangle or angles on a straight line)  
e  $x = 132$  (vertically opposite angles)  
f  $x = 67$  (angle sum of a quadrilateral)

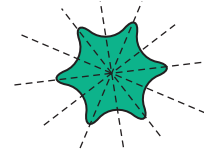
- g  $y = 130$  (different reasons possible: corresponding/alternate angles on parallel lines, angles on a straight line)  
h  $x = 62$  (exterior angle of a triangle)  
i  $m = 62$  (angle sum of an isosceles triangle, corresponding angles on parallel lines)

11 a



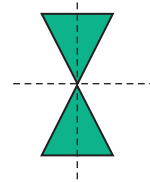
Rotational symmetry of order 4.

b



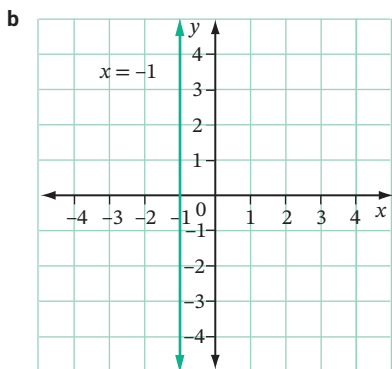
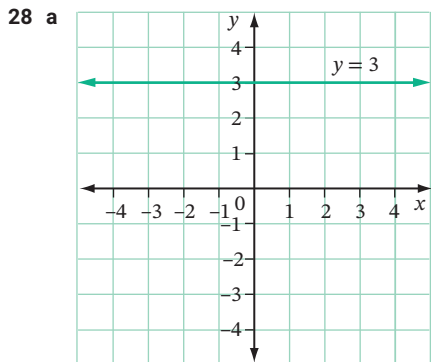
Rotational symmetry of order 6.

c

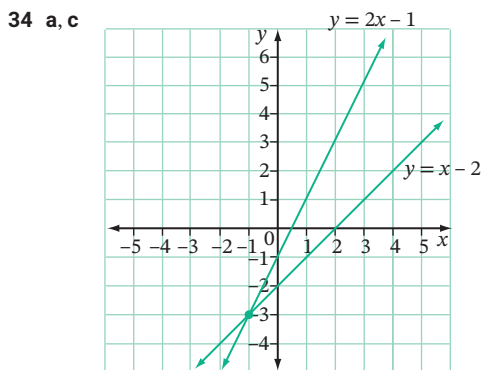


Rotational symmetry of order 2.

- 12 a  $m = 17.7$       b  $y = 16.6$   
c  $p = 25.5$       d  $d = 76.0$
- 13 a  $6^2$       b  $2^7$       c  $3^2$       d  $5^3$   
e  $2^{12}$       f  $2^6 \times 5^2$       g  $3^0 = 1$       h 6
- 14 a Not choosing an Ace      b  $\frac{48}{52} = \frac{12}{13}$
- 15 a 187 mm<sup>2</sup>      b 144 cm<sup>2</sup>      c 18.4 m<sup>2</sup>
- 16 a i isosceles      ii acute-angled  
b i scalene      ii obtuse-angled  
c i scalene      ii right-angled
- 17  $200 = 2^3 \times 5^2$
- 18 a 80 000      b 0.49      c 650 000 000
- 19 a  $1\frac{5}{12}$       b  $\frac{7}{15}$       c  $\frac{7}{15}$       d  $\frac{8}{15}$   
e  $1\frac{5}{8}$       f  $3\frac{2}{7}$       g  $11\frac{1}{4}$       h  $6\frac{3}{25}$
- 20  $\frac{3}{20}$
- 21 a  $a = 5$       b  $d = -5$       c  $r = 3$
- 22 a ND      b ND      c NC      d C
- 23 a Yes      b No
- 24 a QR      b  $\angle L$       c  $\triangle SRQ$
- 25 \$940.80
- 26 a  $y = 3x + 4$       b  $x = 3$
- 27 a 8 glasses      b 600 L

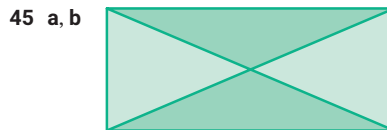


- 29 a  $3a + 15$       b  $20 - 8k$       c  $-15$   
 30 a  $6 : 7$       b  $20 : 1$       c  $1 : 100$   
 31 280      32 109 cm  
 33 a 6:40 p.m.      b 1:55 a.m.



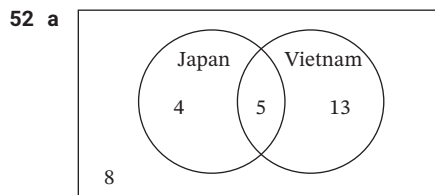
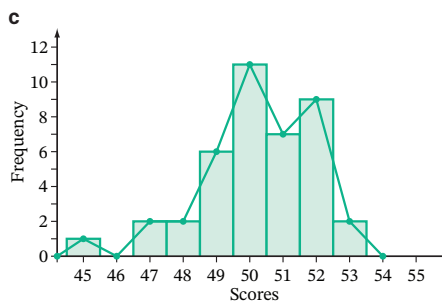
- b yes      d  $x = -1$   
 35 a \$36      b 60%  
 36 a rectangle (or square)  
 b equilateral triangle  
 c rectangle (or rhombus)  
 d isosceles triangle  
 37 a i 43.98 m      ii 153.94 m<sup>2</sup>  
 b i 25.71 cm      ii 39.27 cm<sup>2</sup>  
 c i 66.85 cm      ii 272.55 cm<sup>2</sup>  
 d i 62.83 mm      ii 85.84 mm<sup>2</sup>  
 38 a  $2(y + 4)$       b  $5a(1 - 3b)$       c  $-2b(4a - 1)$

- 39 \$200  
 40 a  $\frac{1}{2}$       b  $\frac{2}{7}$       c  $\frac{11}{14}$   
 41 4900      42 16.12 m      43 80 m<sup>2</sup>  
 44 a 62      b 42      c 42.5



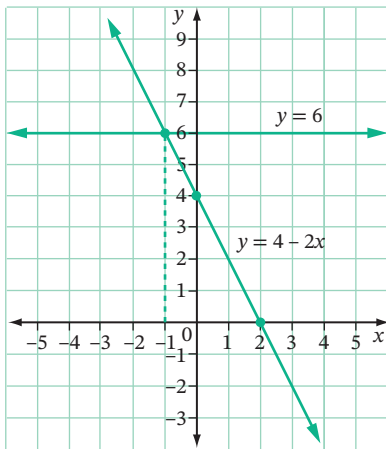
- c Diagonals are equal and bisect each other.  
 46 a RHS      b SAS      c SSS      d AAS  
 47 2.5 cm      48 B  
 49 a 400 cm<sup>3</sup>      b 288 cm<sup>3</sup>      c 300 mm<sup>3</sup>  
 d 910 m<sup>3</sup>      e 84 m<sup>3</sup>      f 4536.5 mm<sup>3</sup>  
 50 \$50.40  
 51 a      b 50.25

Score	Tally	f	fx
45		1	45
47		2	94
48		2	96
49		6	294
50		11	550
51		7	357
52		9	468
53		2	106
	Total	40	2010



- b 8      c 4      d  $\frac{7}{10}$   
 53 a 19 500 cm<sup>3</sup>      b 19.5 L  
 54  $x = 7$       55 6.1 m/s  
 56 a \$600      b 450 kg  
 57 a 4 km      b 80 min, 7 km  
 c 20 min      d 8 km/h

58  $x = -1$



59  $y = 2x - 4$

60 \$110

## Calculator skills

### Exercise 1

- |              |             |             |
|--------------|-------------|-------------|
| 1 a 5068     | b 14.5      | c 45        |
| d 5.724      | e 3.5       | f 26.9      |
| g 23         | h 1.68      | i 160       |
| j 29.48      | k -8.084    | l 12.42     |
| 2 a \$19.15  | b 85 cents  |             |
| 3 \$1875.50  | 4 7542 kg   |             |
| 5 2.4 m      | 6 \$18.75   | 7 23 trees  |
| 8 75.2 km/h  | 9 \$85.74   | 10 13 buses |
| 11 a \$41.20 | b \$1318.40 |             |
| 12 53.4      |             |             |

### Exercise 2

- |       |       |       |      |
|-------|-------|-------|------|
| 1 a 7 | b -9  | c -12 | d -8 |
| e 15  | f -15 | g 75  | h 5  |
| i -5  | j 7   | k -96 | l 45 |

- |       |      |       |      |
|-------|------|-------|------|
| m -25 | n 24 | o 96  | p 14 |
| q -16 | r 15 | s -36 | t 10 |

### Exercise 3

- |           |          |          |         |
|-----------|----------|----------|---------|
| 1 a 196   | b 529    | c 216    | d 1.728 |
| e 26.3169 | f 10 201 | g 4.1616 | h 6859  |
| i 26      | j 148    | k 9      | l 42    |
| 2 a 4.9   | b 10.0   | c 4.7    | d 4.6   |
| 3 a 16    | b 156    | c 6      | d 10    |

### Exercise 4

- |                           |                         |                    |                     |
|---------------------------|-------------------------|--------------------|---------------------|
| 1 a $\frac{5}{8}$         | b $\frac{8}{17}$        | c $\frac{5}{8}$    |                     |
| d $\frac{8}{9}$           | e $\frac{21}{25}$       | f $\frac{1}{4}$    |                     |
| 2 a $\frac{15}{8}$        | b $\frac{47}{9}$        | c $\frac{43}{4}$   |                     |
| 3 a $2\frac{2}{9}$        | b $8\frac{4}{5}$        | c $2\frac{1}{4}$   |                     |
| 4 a 0.5                   | b 0.8                   | c 0.875            |                     |
| d 0.36                    | e 0.17                  | f 0.5              |                     |
| 5 a $\frac{7}{20}$        | b $2\frac{1}{25}$       | c $\frac{1}{1000}$ |                     |
| d $\frac{73}{200}$        | e $1\frac{3}{50}$       | f $\frac{13}{40}$  |                     |
| 6 a $\frac{17}{20}$       | b $1\frac{1}{14}$       | c $\frac{1}{15}$   | d $\frac{4}{21}$    |
| e $1\frac{1}{3}$          | f $\frac{5}{24}$        | g $1\frac{17}{30}$ | h $\frac{35}{96}$   |
| i $1\frac{3}{4}$          | j $19\frac{1}{5}$       | k $6\frac{13}{20}$ | l $8\frac{13}{24}$  |
| m $12\frac{3}{4}$         | n 7                     | o $\frac{4}{27}$   | p $19\frac{19}{60}$ |
| 7 a $\frac{1}{8}$         | b $\frac{3}{4}$         |                    |                     |
| c $15\frac{4}{5}$ or 15.8 | d $\frac{1}{6}$ or 0.16 |                    |                     |
| 8 a $6\frac{3}{4}$ hours  | b $33\frac{3}{4}$ hours |                    |                     |