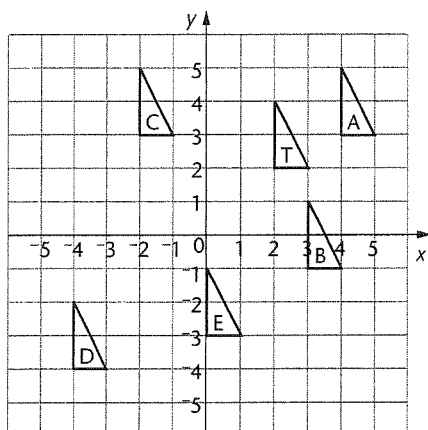


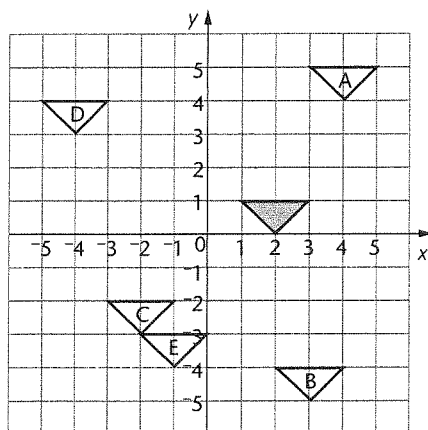
5 Translations

Exercise 5.1 (page 45)

1



2



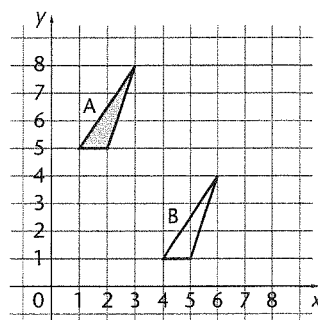
- 3 a) Translation of $\begin{pmatrix} 5 \\ 2 \end{pmatrix}$
b) Translation of $\begin{pmatrix} 4 \\ -6 \end{pmatrix}$
c) Translation of $\begin{pmatrix} 1 \\ 8 \end{pmatrix}$
d) Translation of $\begin{pmatrix} -4 \\ 6 \end{pmatrix}$
- 4 a) Translation of $\begin{pmatrix} -2 \\ -5 \end{pmatrix}$
b) Translation of $\begin{pmatrix} -7 \\ -6 \end{pmatrix}$
c) Translation of $\begin{pmatrix} -8 \\ 0 \end{pmatrix}$
d) Translation of $\begin{pmatrix} 1 \\ -6 \end{pmatrix}$

Revision exercise A1 (page 47)

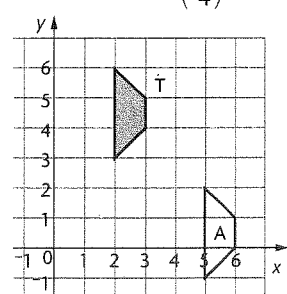
- 1 a) 2.39 b) -12.9
c) 3.133
- 2 a) 11.16 b) -63.58
c) 0.147
- 3 a) 81 b) 256
c) 1843.291
- 4 a) 9.434 to 3 d.p. b) 1.7363

c) -50.653

- 5 a) $\frac{1}{5}$ or 0.2 b) $\frac{5}{4}$ or 1.25
c) $\frac{4}{9}$ d) 2.5
- 6 8.4 cm to 1 d.p.
- 7 a) $4a - 12$ b) $15 + 5x$
c) $7a + 14$ d) $9 + 6x$
e) $45x + 35$
- 8 a) $6(2a - 1)$ b) $x(15x - 1)$
c) $a(4a + 1)$ d) $a(a + 4)$
e) $y(3 - 7y)$
- 9 $30^\circ, 75^\circ$ and 75° or $30^\circ, 30^\circ$ and 120°
- 10 77°
- 11 $a = 124^\circ$, Alternate angles
 $b = 60^\circ$, Alternate angles
 $c = 75^\circ$, Corresponding angles
 $d = 94^\circ$, Allied angles
- 12 58°
- 13 $\frac{7}{8}$
- 14 0.29
- 15 0.3
- 16 a), b)



- c) Translation of $\begin{pmatrix} 3 \\ -4 \end{pmatrix}$
- 17 a)



- b) Translation of $\begin{pmatrix} -3 \\ 4 \end{pmatrix}$

6 Fractions

Exercise 6.1 (page 50)

- 1 a) $9\frac{7}{9}$ b) $24\frac{7}{8}$
c) $40\frac{3}{8}$
- 2 a) $\frac{3}{4}$ b) $\frac{5}{6}$
c) $\frac{3}{10}$
- 3 a) $\frac{11}{20} \frac{3}{5} \frac{7}{10} \frac{3}{4}$ b) $\frac{7}{12} \frac{3}{4} \frac{5}{6} \frac{7}{8}$
c) $\frac{3}{10} \frac{2}{5} \frac{1}{2} \frac{2}{3} \frac{13}{15}$ d) $\frac{7}{16} \frac{1}{2} \frac{5}{8} \frac{3}{4} \frac{13}{16}$
e) $\frac{3}{8} \frac{2}{5} \frac{17}{40} \frac{9}{20} \frac{1}{2}$ f) $\frac{5}{12} \frac{7}{8} \frac{8}{9}$

23 $x = -3$
 25 $x = 5$
 27 $x = 4$
 29 $x = -9\frac{1}{2}$

24 $x = 7$
 26 $x = 0$
 28 $x = 9$
 30 $x = -7$

6 B 157.1 m, C 188.5 m, final answer 31.4 m
 7 a) 23.9 cm b) 5.7 cm
 8 15.9 cm
 9 95.5 m

10 Powers and indices

Exercise 10.1 (page 80)

1 2^5	2 6^3
3 7^5	4 $3^3 \times 6^2$
5 $2^2 \times 3^5 \times 4^3$	6 5^5
7 9^3	8 3^5
9 $4^2 \times 5^3$	10 $7^2 \times 8^3 \times 9^4$
11 x^5	12 y^4
13 z^7	14 m^2n^4
15 f^4g^5	16 p^3r^4
17 $56k^3$	18 $a^2 + b^2 + c^2$
19 $p^2 + q^2$	20 $4^3 + 5^3$
21 3^2a^2	22 $6^2 - 5^2$

Exercise 10.2 (page 81)

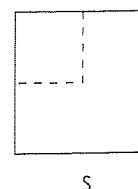
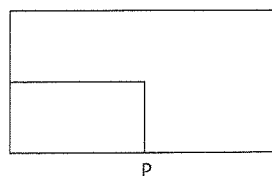
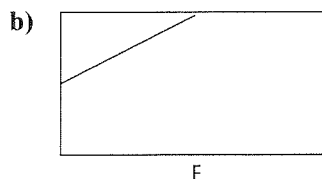
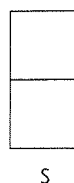
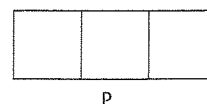
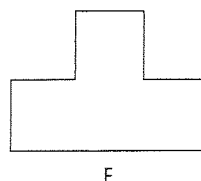
1 a) (i) $x = 20$	(ii) $x = -5$
b) (i) $x = 48$	(ii) $x = 12$
c) (i) $x = 60$	(ii) $x = -48$
d) (i) $x = 7$	(ii) $x = 7$
2 a) (i) $y = 10$	(ii) $y = -2$
b) (i) $y = 39$	(ii) $y = -6$
c) (i) $y = 21.896$	(ii) $y = 12.006$
d) (i) $y = -990$	(ii) $y = -52.5$
3 a) 10	b) 11.96
4 80 minutes	
5 a) 45 metres	b) 101.25 metres
6 -1	
7 a) 1	b) 30
c) 13	d) 27
e) 100	f) -54
8 a) -18	b) 15
9 a) 11	b) 115
10 a) 50	b) 3000

Exercise 11.2 (page 89)

1 a) 50.3 cm^2	b) 804 m^2
c) 401 m^2	d) 581 m^2
e) 249 cm^2	
2 a) 28.3 cm^2	b) 201 m^2
c) 88.2 cm^2	d) 547 cm^2
e) 16.6 m^2	
3 7.07 m^2	
4 254 cm^2	
5 0.503 m^2	
6 1099 m^2	
7 124 cm^2	
8 Square: 12.25 cm^2 , circle: 12.57 cm^2 so the circle has the larger area	
9 4.52 m^2	
10 14.1, so she will need 15 packets	
11 145 cm^2 ; $3 \times 7^2 = 3 \times 49 \approx 3 \times 50 = 150 \text{ cm}^2$	
12 393 cm^2	

Revision exercise B1 (page 91)

1 $\frac{7}{20}$	$\frac{3}{4}$	$\frac{4}{5}$	$\frac{17}{20}$
2 a) $\frac{3}{4}$	b) $1\frac{3}{8}$		
c) $\frac{3}{8}$	d) $3\frac{7}{8}$		
e) $2\frac{1}{40}$			
3 a)			

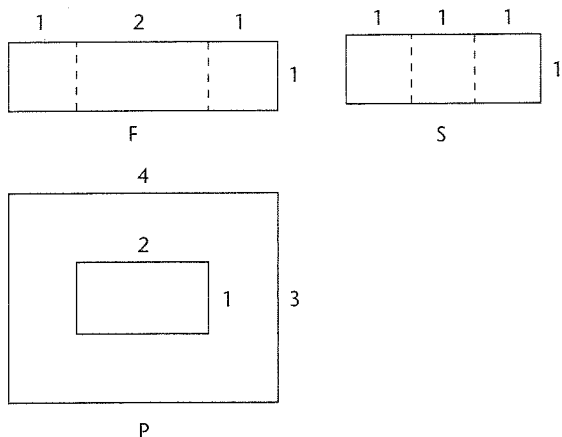


11 Circles

Exercise 11.1 (page 86)

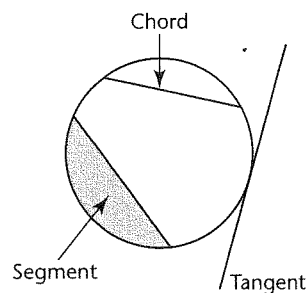
1 a) 37.7 cm	b) 28.3 cm
c) 62.8 m	d) 51.2 cm
e) 47.8 m	f) 78.5 m
g) 0.9 cm	h) 53.4 m
i) 15.9 m	j) 20.4 cm
2 a) 31.4 cm	b) 44.0 cm
c) 100.5 m	d) 113.7 m
e) 33.3 m	f) 175.9 cm
g) 20.1 cm	h) 377.0 m
i) 11.9 m	j) 458.7 cm
3 57.5 m	
4 40 074 km	
5 94.3 cm (rounding up)	

4 Not to size: lengths, in centimetres, given



- 5 a) 9:2 b) 5:1
 c) 3:2 d) 3:1
 e) 5:12
 6 a) 7:10 b) 5:2
 c) 6:1 d) 60:1
 7 a) 12 b) 6
 8 300 g
 9 £180, £240

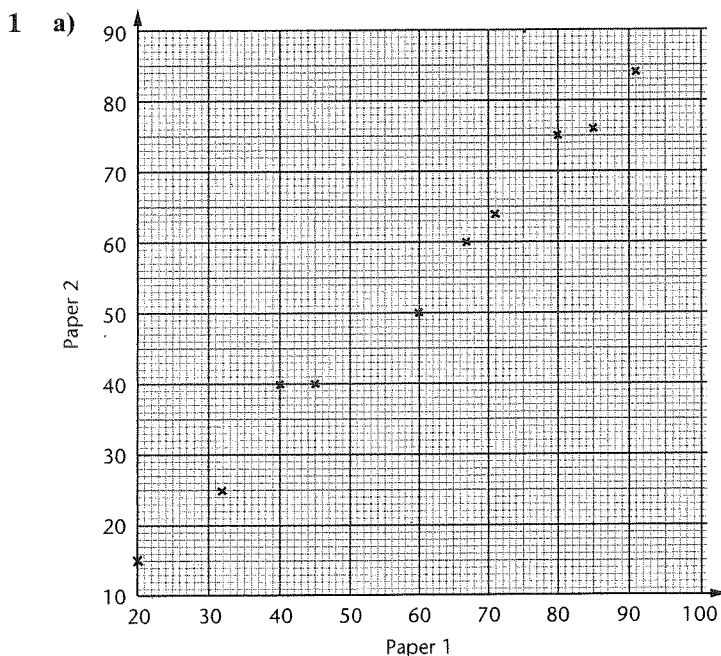
- 10 a) $x = -4$ b) $x = 1$
 c) $x = 5$ d) $x = 3$
 e) $x = 0$
 11 a) $x = 6$ b) $x = 2$
 c) $x = -16$ d) $x = -3\frac{2}{5}$
 e) $x = 2\frac{1}{4}$
 12 a) 3^7 b) $6^3 \times 7^2$
 c) a^5
 13 a) 18 b) -81
 14 43
 15



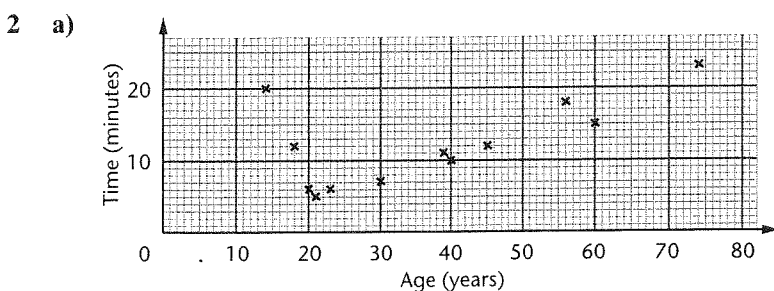
- 16 a) 18.8 cm b) 62.8 cm
 c) 12.6 cm
 17 a) 12.6 cm² b) 28.3 cm²
 c) 452.4 cm²
 18 9.5 m

12 Scatter diagrams

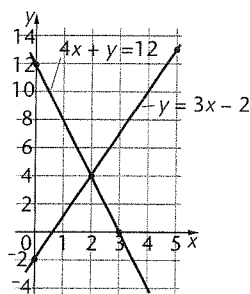
Exercise 12.1 (page 96)



b) The higher the Paper 1 mark, the higher the Paper 2 mark tends to be.



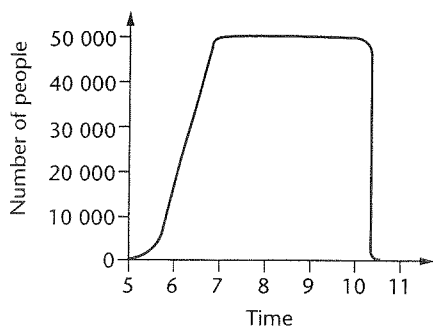
- 5 a) $y = 3x - 2$, points are (0, -2), (2, 4), (5, 13)
 $4x + y = 12$, points are (0, 12), (3, 0)
 b) (2, 4)



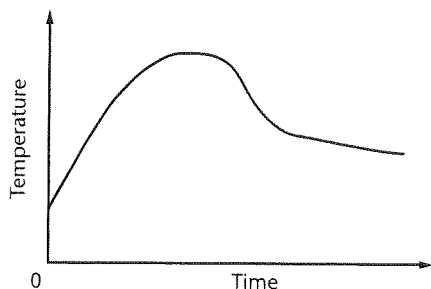
17 Real-life graphs

Exercise 17.1 (page 133)

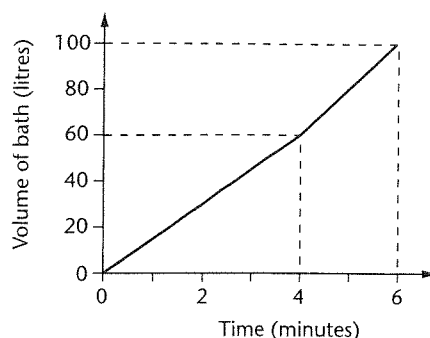
- 1 a) July, 22°C b) 14°C
 c) September
 2 a) Brussels b) 54 mm
 c) March, October, November
 3 a) 5 minutes b) 30 litres
 c) 10
 4 Possible answers are:
 a) she turned one tap off
 b) the second tap was turned off
 or a) she turned both taps off and she slowly got into the bath
 b) she stopped getting in
 c) she pulled the plug out
 d) the plug partially blocked the drain
 5 a) 0600 b) 20°C
 c) 15.5°C
 6 a) 9:30 a.m. b) 11 a.m. – 12 noon
 7



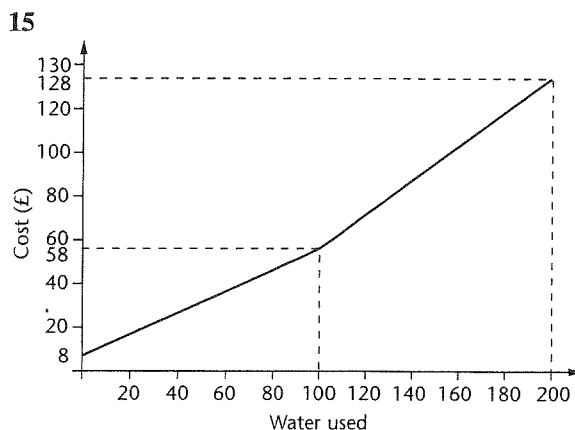
- 8 a) 3
 b) The car continued on its journey, then stopped and filled up with petrol, then carried on.
 9 a) 0.8 m b) 2.2 m
 c) Between 6.5 and 7 minutes; 4.6 m
 10 e.g.



- 11 a) The car is going at a constant speed of 20 mph.
 b) 2 and 3 minutes
 12 a)

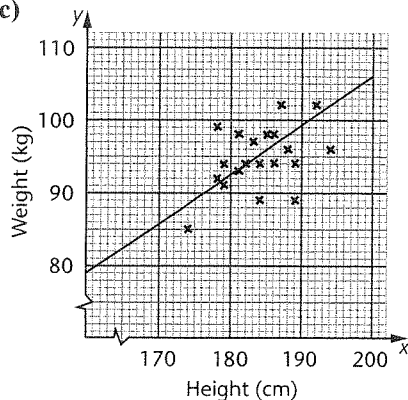


- b) 100 litres
 13 a) £42 b) 225
 c) (i) £30 (ii) 8p
 14 a) 10 minutes
 b) The cost per minute is less after 20 minutes have been used.



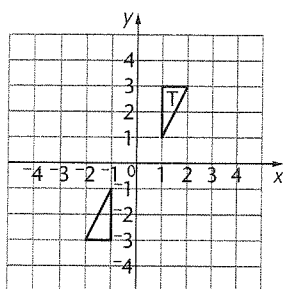
Revision exercise C1 (page 138)

- 1 a) 96 kg
 b), c)

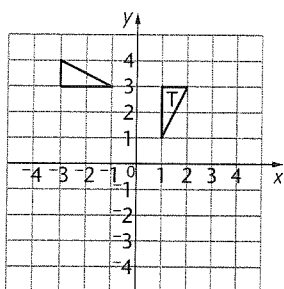


- Accept reasonable line of best fit.
 d) 105 kg (from student's line of best fit).
 2 Negative
 3 Girls generally better and have less variation.

4



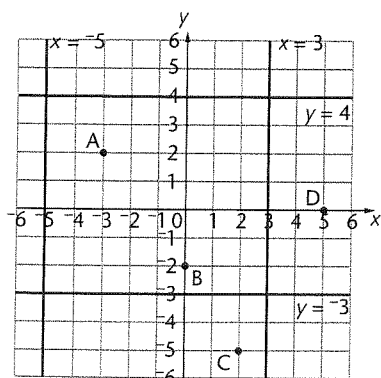
5



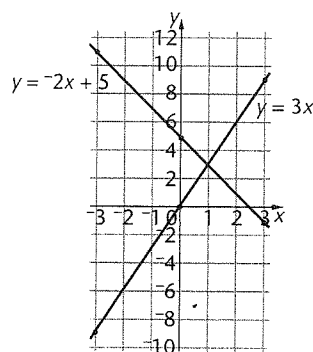
- 6 a) Rotation 180° about the centre $(0, 0)$.
 b) Rotation 90° (anticlockwise) about the centre $(0, 0)$ or a reflection in the y -axis.
 c) Rotation 180° about the centre $(-4, -4)$.
 d) Rotation 90° (anticlockwise) about the centre $(4, 2)$.

- 7 a) $\frac{2}{5}$ b) $\frac{1}{6}$
 c) $\frac{3}{28}$ d) 3
 e) $2\frac{1}{10}$ f) $1\frac{13}{14}$
 8 a) £10.56 b) £24.60
 c) £4.48 d) £10.59
 9 a) 4.16 b) 36.25
 c) 22.52 d) 34.3
 10 a) 60.8 b) 34.3
 c) 0.12 d) 7.2
 e) 12 000 f) 2796
 g) 5640 h) 0.09
 11 a) 12.1 b) 110.1
 c) 0.811 d) 17.1
 e) 5 f) 8
 g) 6.5 h) 20

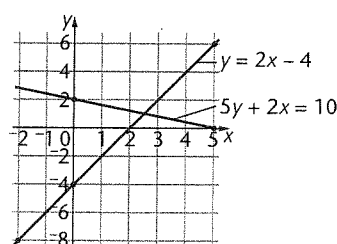
12



- 13 a) Points are $(-3, -9)$, $(0, 0)$, $(3, 9)$
 b) Points are $(-3, 11)$, $(0, 5)$, $(3, -1)$

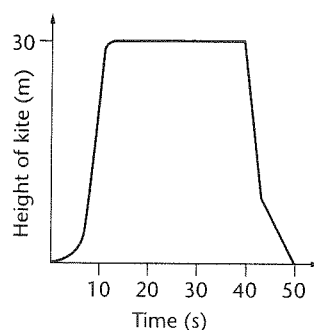


- c) Point of intersection is $(1, 3)$
 14 a) Points are $(-2, -8)$, $(0, -4)$, $(5, 6)$
 b) Points are $(0, 2)$, $(5, 0)$



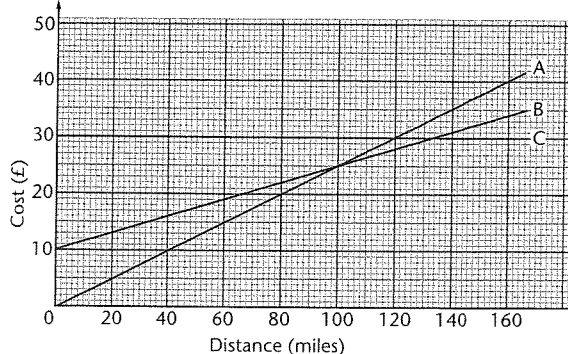
- c) Point of intersection is $(2.5, 1)$
 15 a) 5 miles
 b) The train was not moving.
 c) The train was braking for the station.
 d) CD

16

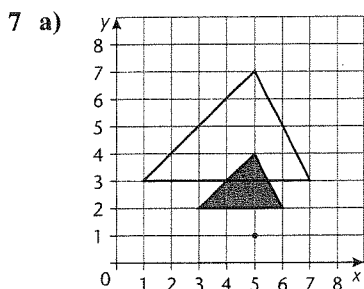
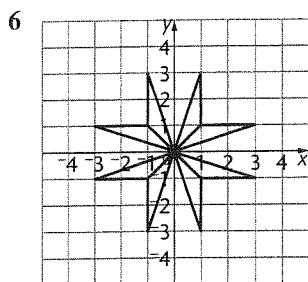


- 17 a) (i) £0 (ii) £7.50
 (iii) £25.00
 b) (i) £10 (ii) £14.50
 (iii) £25.00
 c) (i) £30 (ii) £30
 (iii) £30

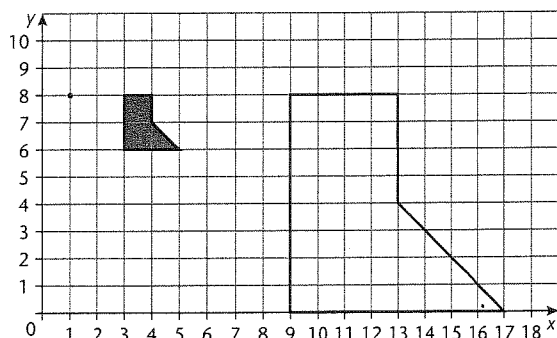
d)



- (i) A (ii) B (iii) C



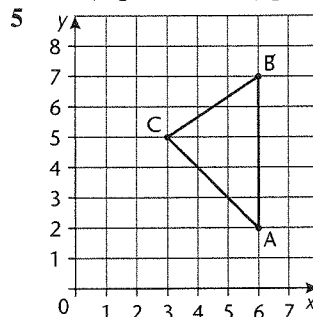
b)



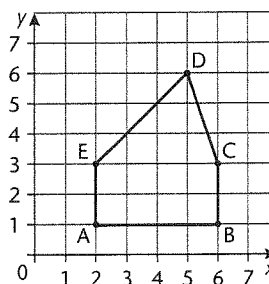
- 8 a) Scale factor 3, centre of enlargement (0, 0)
b) Scale factor 2, centre of enlargement (8, 9)
- 9 a) A translation by vector $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$
b) A translation by vector $\begin{pmatrix} -1 \\ -2 \end{pmatrix}$
c) A translation by vector $\begin{pmatrix} -2 \\ 1 \end{pmatrix}$
d) A translation by vector $\begin{pmatrix} -4 \\ 2 \end{pmatrix}$
- 10 a) A reflection in the line $y = 2$
b) A reflection in the line $x = 3$
c) A reflection in the line $y = x$
- 11 a) A translation by vector $\begin{pmatrix} -5 \\ 2 \end{pmatrix}$
b) A rotation of 90° (anticlockwise) about the origin
c) A rotation of 90° clockwise or -90° about (2, 2)
d) A translation by vector $\begin{pmatrix} -3 \\ -4 \end{pmatrix}$
e) A reflection in the x -axis or the line $y = 0$
f) A reflection in the line $y = x$
g) A translation by vector $\begin{pmatrix} 2 \\ -6 \end{pmatrix}$
h) A rotation of 180° about (0, 2)

Revision exercise D1 (page 213)

- 1 a) Check students' diagrams.
b) 34°
- 2 c
- 3 a, b, d
- 4 a) Triangular prism
b) (Square-based) pyramid



7.5 square units



- 6 a) 8 square units b) 6 square units
c) 14 square units
- 7 a) 26.6 cm^2 to 1 d.p. b) 27 cm^2
c) 29.8 cm^2 to 1 d.p.
- 8 a) 30.0 cm^2 to 1 d.p. b) 30 cm^2
c) 31.9 cm^2 to 1 d.p.
- 9 a) 7.5 cm^2 b) 21 cm^2
- 10 a) 26 cm b) 27 cm
- 11 a) 34.9 m^3 to 1 d.p. b) 51.92 m^2
c) 3.6 (or 4) litres
- 12 a) 169.32 cm^3 b) 257.544 cm^3
- 13 a)
- | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 4 | 4 | 9 | | | | | | |
| 5 | 0 | 2 | 2 | 2 | 3 | 4 | 7 | 7 |
| 6 | 4 | 4 | 5 | 7 | | | | |
| 7 | 0 | 0 | 3 | 3 | 3 | 4 | 5 | 9 |
| 8 | 2 | 2 | 2 | 3 | 5 | 9 | 9 | |
| 9 | 0 | 1 | 1 | 2 | 6 | 9 | | |

Key: 9 | 0 represents 9.0 m

- b) 36 c) 7.3 m

14 a)

Number of matches	Frequency
80	1
81	0
82	1
83	1
84	2
85	3
86	2

b) 85 c) 84

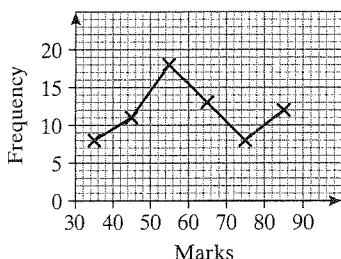
d) 84

15 a) 42

b) 4

c) 3.6

16 a)



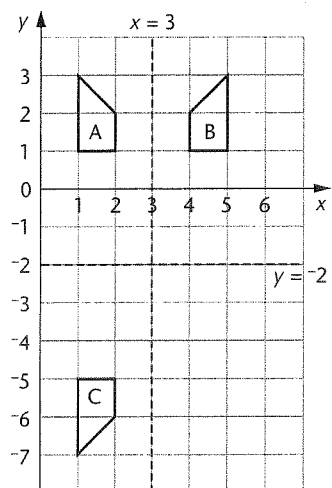
b) Suitable comments include the following.
The marks range from 30 to 90.
There are few low marks.
The modal class is 50 to 60 marks.

c) $50 \leq m < 60$

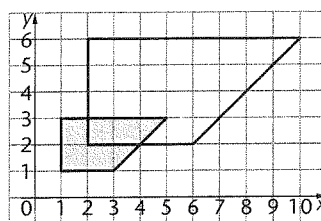
d) 70

e) $\frac{2}{7}$

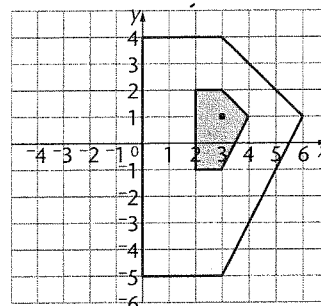
17



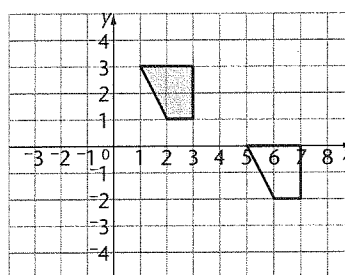
18



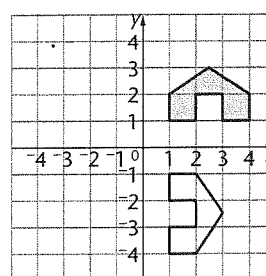
19



20



21



22 a) Reflection in the y-axis or $x = 0$.

b) Reflection in the line $y = 2$.

c) Translation by $\begin{pmatrix} 8 \\ -1 \end{pmatrix}$.

d) Enlargement scale factor 2, centre (0, 0).

e) Translation by $\begin{pmatrix} -4 \\ 7 \end{pmatrix}$.

f) Reflection in the line $y = x$.

g) Rotation of 90° anticlockwise about (0, 0).