

Answers to Homework Book 7

1 Coordinates

Exercise 1.1H (page 1)

- 1 a) (4, 5) b) (5, -0.5)
 c) (-2.5, 6) d) (-3.5, 1)
 e) (-1.5, -5.5)
- 2 a) (-1, 7) b) (5, 3)
 c) (5.5, 4.5) d) (5, 4.5)
 e) (-2, 3.5) f) (-6, -4.5)

Exercise 1.2H (page 1)

- 1 a) (5, 0, 0) b) (5, 0, 3)
 c) (0, 0, 3) d) (0, 7, 0)
 e) (5, 7, 0) f) (0, 7, 3)
- 2 a) (8, 0, 0) b) (8, 10, 0)
 c) (0, 10, 0) d) (4, 5, 0)
 e) (4, 5, 7)
- 3 a) (i) (6, 5, 0) (ii) (6, 5, 3)
 (iii) (0, 5, 3) (iv) (6, 5, 1.5)
 (v) (3, 5, 3)
- b) (i) AB (ii) OCGD

2 Percentages

Exercise 2.1H (page 3)

- 1 a) $\frac{9}{20}$ b) $\frac{3}{4}$
 c) $\frac{3}{25}$ d) $1\frac{1}{10}$
- 2 a) 0.19 b) 0.4
 c) 0.09 d) 0.175
- 3 a) 47% b) 82%
 c) 4% d) 42.5%
 e) 135%

4

| Fraction | Decimal | Percentage |
|----------------|---------|------------|
| $\frac{3}{10}$ | 0.3 | 30% |
| $\frac{3}{5}$ | 0.6 | 60% |
| $\frac{7}{20}$ | 0.35 | 35% |
| $\frac{3}{8}$ | 0.375 | 37.5% |
| $\frac{5}{6}$ | 0.833 | 83.3% |

- 5 a) 0.19 b) 0.18
 c) 0.65 d) 0.03
 e) 1.75

- 6 a) 6% b) 6%
 c) 87.5% d) 180%
 e) 27.3%

Exercise 2.2H (page 4)

- 1 5%
 2 20%
 3 £65.80
 4 £42.25
 5 17%

3 Ratio and proportion

Exercise 3.1H (page 5)

- 1 a) 1:11 b) 5:12
 c) 8:21 d) 1:2:4
 e) 3:9:17
- 2 a) 150:1 b) 21:100
 c) 1:10 d) 1:17
 e) 9:5
- 3 17:15
 4 1:5
 5 1:8:200

Exercise 3.2H (page 5)

- 1 a) 6 buckets b) 5 buckets
 2 a) 2.5 kg b) 900 g
 3 24 cm
 4 a) 72 b) 40
 5 a) 200 ml b) 750 ml
 6 a) 600 m b) 38 cm
 7 a) 12 cm b) 6.3 cm
 8 a) 6000 votes b) 3000 votes

Exercise 3.3H (page 7)

- 1 Mrs Smith 12 hours,
 Mrs Rogers 28 hours
- 2 a) 4 litres b) 6 litres
- 3 Meat 500 g, onion 125 g, carrot 375 g
- 4 2 hours 30 minutes
- 5 £520
- 6 £840
- 7 192
- 8 a) 3:2
 b) Iain 126 000 euros,
 Stephen 84 000 euros

5 Using and generating formulae

Exercise 5.1H (page 13)

- $C = mq$
- $s = \frac{d}{t}$
- $n = 10t + u$
- $A = \frac{p + q + r}{3}$
- $p = hr - t$
- $t = 4.5w$
- $n = \frac{r}{3}$
- $s = n - d$
- $f = \frac{d}{5} + 3$
- $C = 400 + 7s$

Exercise 5.2H (page 14)

- £15
- 40 mph
- 53
- 15
- £205
- £54
- 8
- £449
- £3.90
- £561

Exercise 5.3H (page 14)

- 8
- 38
- 7.6
- 52
- 2
- 438
- 1543
- 46.32
- 203.97
- 1.46

6 Solving angle problems

Exercise 6.1H (page 15)

- $a = 70^\circ$ Angles on a straight line add up to 180°
- $b = 37^\circ$ Angles on a straight line add up to 180°
- $c = 120^\circ$ Angles round a point add up to 360°
- $d = 122^\circ$ Angles round a point add up to 360°

- $e = 100^\circ$ Vertically opposite angles
 $f = 80^\circ$ Angles on a straight line add up to 180°
 $g = 80^\circ$ Vertically opposite angles
or Angles on a straight line add up to 180°
- $h = 35^\circ$ Angles in a triangle add up to 180°
- $i = 43^\circ$ Angles in a triangle add up to 180°
- $j = 35^\circ$ $k = 35^\circ$
Angles in a triangle add up to 180° and the angles of an isosceles triangle opposite the equal sides are equal.
- $l = 115^\circ$ Angles in a quadrilateral add up to 360°
- $m = 100^\circ$ Angles on a straight line add up to 180°
 $n = 84^\circ$ Angles in a quadrilateral add up to 360°

Exercise 6.2H (page 16)

- $a = 60^\circ$ Corresponding angles
- $b = 75^\circ$ Allied angles
- $c = 65^\circ$ Alternate angles
- $d = 49^\circ$ Corresponding angles
 $e = 49^\circ$ Alternate or opposite angles
- $f = 60^\circ$ Allied angles
 $g = 120^\circ$ Alternate angles *or* Angles on a straight line add up to 180°
- $h = 100^\circ$ Corresponding angles
 $i = 80^\circ$ Allied angles *or* Angles on a straight line add up to 180°
- $j = 60^\circ$ Alternate angles
 $k = 120^\circ$ Angles on a straight line add up to 180°
- $l = 118^\circ$ Corresponding angles
 $m = 62^\circ$ Allied angles
 $n = 118^\circ$ Alternate angles
- $o = 40^\circ$ Alternate angles
 $p = 47^\circ$ Allied angles
- $q = 35^\circ$ Corresponding angles
 $r = 55^\circ$ Angles in a triangle add up to 180°
 $s = 55^\circ$ Corresponding angles *or* Angles in a triangle add up to 180°

Exercise 6.3H (page 17)

- 1260°
- 1980°
- a) 47.5°
b) 87°, 130°, 143°, 95°, 132.5°, 132.5°
- a) 58°
b) 10°, 100°, 23°, 105°, 122°
- $e = 20^\circ$, $i = 160^\circ$
- $e = 15^\circ$, $i = 165^\circ$
- 30
- 45

Exercise 6.4H (page 17)

- 1 $a = 113^\circ$
- 2 $b = 65^\circ$
- 3 $c = 76^\circ$
- 4 $d = 44^\circ$
- 5 $e = 131^\circ$
- 6 $f = 35^\circ$
- 7 $g = 150^\circ$
- 8 $h = 130^\circ$

7 Direct proportion

Exercise 7.1H (page 19)

1 a)

| | | | |
|-----|----|----|----|
| x | 8 | 4 | 12 |
| y | 20 | 10 | 30 |

b)

| | | | |
|-----|---|------|-------|
| x | 4 | 7 | 19 |
| y | 5 | 8.75 | 23.75 |

2 Yes, y is proportional to x . There is a constant multiplier of 1.8.

3 $y = 0.4x$

4 a)

| | | | |
|-----|----|----|----|
| x | 4 | 7 | 10 |
| y | 28 | 49 | 70 |

$y = 7x$

b)

| | | | |
|-----|----|-----|-------|
| x | 20 | 90 | 142 |
| y | 26 | 117 | 184.6 |

$y = 1.3x$

5 a) 19.5 b) 24

6 a) 3 b) 22

7 20

8 16 hours

9 £37.50

10 a) £28.80

b) No, he can only buy enough for 41.7 miles.

8 Checking solutions and calculations

Exercise 8.1H (page 21)

1 Check student's answers. Possible answers include the following.

- a) Positive \div negative = negative
- b) Multiplying by number greater than 1 should make answer larger
- c) $5 \times 300 = 1500$ and answer should be less than this
- d) $7^2 = 49$ and answer should be more than this
- e) $9 \times 60 = 540$
- f) Negative \times negative = positive
- g) $0.2^2 = 0.04$
- h) $5 \times 1 = 5$ so last digit should be 5

- 2 a) $90 \times 100 = 9000$
- b) $0.6^2 = 0.36$
- c) $-20 + 5 = -15$
- 3 a) $3 \times \text{£}20 = \text{£}60$
- b) $40 \times \text{£}6 = \text{£}240$
- c) $5 \times \text{£}8 + 2 \times \text{£}2 = \text{£}44$
- 4 a) $83.7 \times 235 = 19\,669.5$
- b) $71.2^2 = 5069.44$
- c) $120.28 \div 9.7 = 12.4$ or $120.28 \div 12.4 = 9.7$
- d) $147.32 - 68.2 = 79.12$, $79.12 \div 4.6 = 17.2$ or $79.12 \div 17.2 = 4.6$

Exercise 8.2H (page 22)

- 1 10
- 2 40
- 3 7
- 4 300
- 5 1000
- 6 0.8
- 7 0.6
- 8 0.05
- 9 2000
- 10 0.01
- 11 8
- 12 20
- 13 700
- 14 8000
- 15 100
- 16 0.7
- 17 0.005
- 18 0.02
- 19 400
- 20 20 000

Exercise 8.3H (page 22)

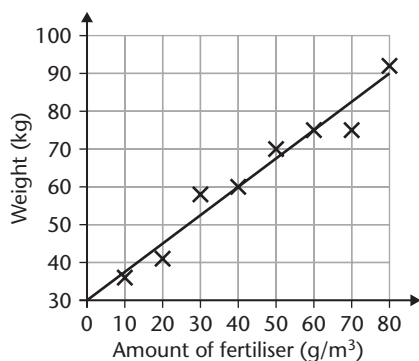
- 1 $200 + 400 = 600$
- 2 $700 \div 80 \approx 10$
- 3 $20 \times 50 = 1000$
- 4 $700^2 = 490\,000 \approx 500\,000$
- 5 $\frac{100}{4 \times 20} = 1.25 \approx 1$
- 6 $60 \times 6 = 360$
- 7 $4 \times 9 = 36$
- 8 $20 \times 30 = 600$
- 9 $70 \times 50 = 3500$
- 10 $\frac{20 \times 6}{40} = 3$
- 11 $\sqrt{10 \times 10} = \sqrt{100} = 10$
- 12 $0.8 \times 30 = 24 \approx 20$
- 13 $\frac{0.6 \times 70}{6} = 7$
- 14 $20^3 = 8000$
- 15 $200 \times 0.3 = 60$
- 16 $\sqrt{10^2 - 5^2} = \sqrt{100 - 25} = \sqrt{75} \approx 9$
- 17 $\frac{50 + 40}{0.02} = \frac{90}{0.02} = \frac{9000}{2} = 4500$
- 18 $70 \times 60 = 4200$

- 19 $\sqrt{50} \approx 7$
- 20 $\frac{6000}{5} = 1200 \approx 1000$
- 21 $20^2 = 400$
- 22 $60 \times 8000 = 480\,000 \approx 500\,000$
- 23 $\frac{6}{20} = 0.3$
- 24 $\frac{30}{50} = 0.6$
- 25 $8000 \times 40 = 320\,000 \approx 300\,000$
- 26 $\frac{900 \times 40}{9} = 4000$
- 27 $\frac{700 \times 0.8}{4 \times 2} = 70$
- 28 $\pounds 600 \div 5 = \pounds 120$
- 29 $\sqrt{6000} \approx 80 \text{ cm}$
- 30 $3 \times 4^2 = 48 \text{ cm}^2$

9 Scatter diagrams and correlation

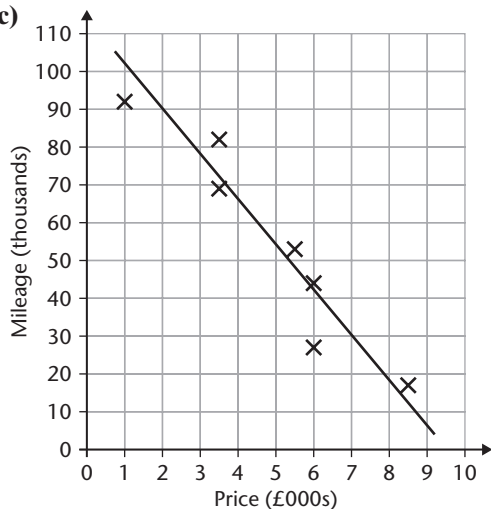
Exercise 9.1H (page 24)

1 a), c)



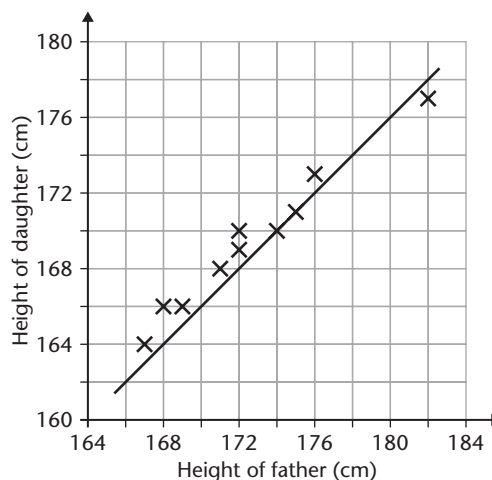
- b) Strong positive correlation
- d) About 87 kg

2 a), c)



- b) Strong negative correlation
- d) (i) About £7800
- (ii) About 67000 miles

3 a), c)



- b) Strong positive correlation
- d) About 176 cm

10 Pythagoras' theorem

Exercise 10.1H (page 26)

- 1 19 cm^2
- 2 40 cm^2
- 3 12 cm^2
- 4 46 cm^2

Exercise 10.2H (page 27)

- 1 6.71 cm
- 2 8.80 cm
- 3 9.48 cm
- 4 25.61 cm

Exercise 10.3H (page 27)

- 1 14.76 cm
- 2 15 m
- 3 11.62 cm
- 4 9.38 cm
- 5 14.81 cm
- 6 20.78 m
- 7 4.91 cm
- 8 19.14 cm

Exercise 10.4H (page 28)

- 1 117 m (to the nearest metre)
- 2 199 cm (to the nearest centimetre)
- 3 9.54 m
- 4 7.81 cm
- 5 170 km

Exercise 10.5H (page 29)

- 1 Yes $15^2 + 20^2 = 25^2$
(This is 5 × the 3, 4, 5 triangle)
- 2 No $4 \cdot 2^2 + 7 \cdot 3^2 \neq 8 \cdot 7^2$
- 3 No $12^2 + 12^2 \neq 15^2$
- 4 Yes $15 \cdot 5^2 + 37 \cdot 2^2 = 40 \cdot 3^2$
(This is 3.1 × the 5, 12, 13 triangle)
- 5 No $7^2 + 8^2 \neq 11^2$
- 6 No $6 \cdot 5^2 + 11 \cdot 1^2 \neq 12 \cdot 8^2$
- 7 Yes $8 \cdot 4^2 + 28 \cdot 8^2 = 30^2$
(This is 1.2 × the 7, 24, 25 triangle)
- 8 No $13 \cdot 5^2 + 27 \cdot 2^2 \neq 30 \cdot 2^2$

11 Quadratic graphs

Exercise 11.1H (page 30)

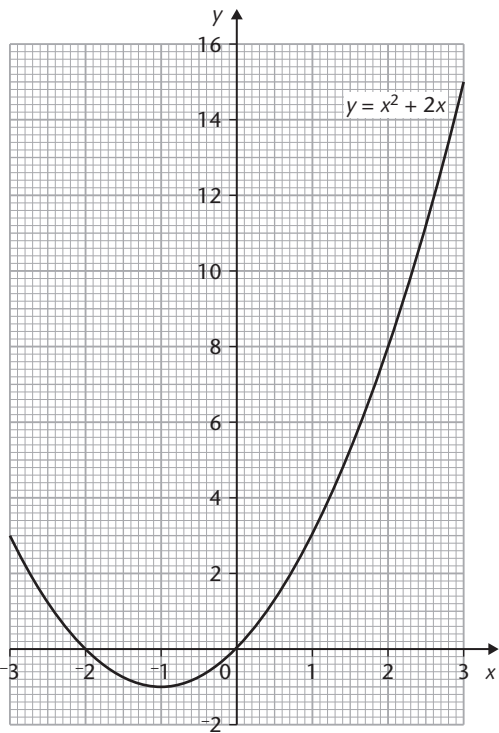
1

| | | | | | | | | |
|--------------------|----|----|----|----|----|----|----|----|
| x | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| x^2 | 4 | 1 | 0 | 1 | 4 | 9 | 16 | 25 |
| $+ 3x$ | -6 | -3 | 0 | 3 | 6 | 9 | 12 | 15 |
| $- 5$ | -5 | -5 | -5 | -5 | -5 | -5 | -5 | -5 |
| $y = x^2 + 3x - 5$ | -7 | -7 | -5 | -1 | 5 | 13 | 23 | 35 |

2 a)

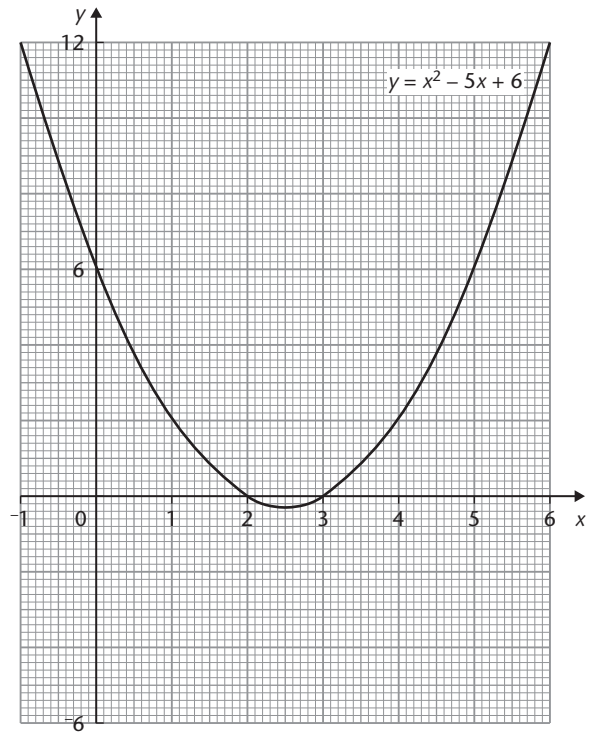
| | | | | | | | |
|----------------|----|----|----|---|---|---|----|
| x | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| x^2 | 9 | 4 | 1 | 0 | 1 | 4 | 9 |
| $+ 2x$ | -6 | -4 | -2 | 0 | 2 | 4 | 6 |
| $y = x^2 + 2x$ | 3 | 0 | -1 | 0 | 3 | 8 | 15 |

b)



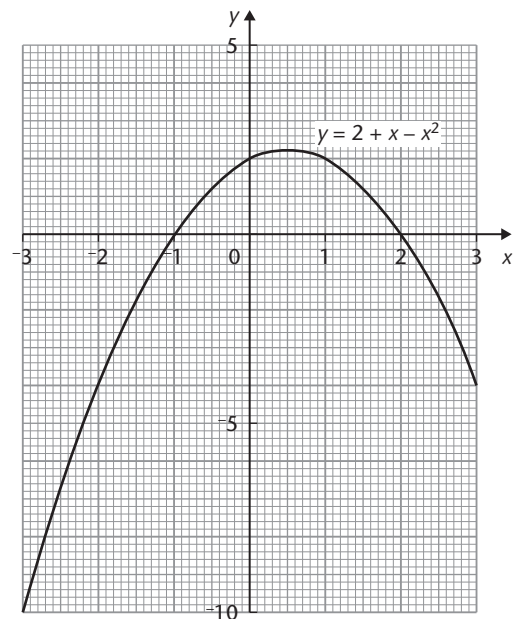
3

| | | | | | | | | |
|--------------------|----|---|----|-----|-----|-----|-----|-----|
| x | -1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| x^2 | 1 | 0 | 1 | 4 | 9 | 16 | 25 | 36 |
| $- 5x$ | 5 | 0 | -5 | -10 | -15 | -20 | -25 | -30 |
| $+ 6$ | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| $y = x^2 - 5x + 6$ | 12 | 6 | 2 | 0 | 0 | 2 | 6 | 12 |



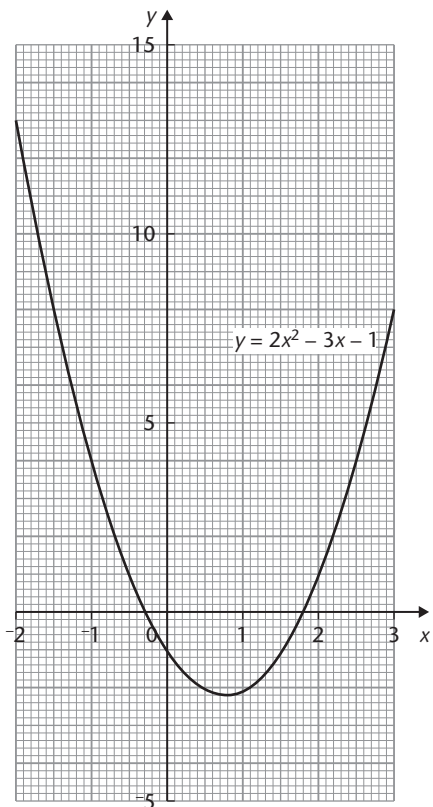
4

| | | | | | | | |
|-------------------|-----|----|----|---|----|----|----|
| x | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| $+ x$ | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $- x^2$ | -9 | -4 | -1 | 0 | -1 | -4 | -9 |
| $y = 2 + x - x^2$ | -10 | -4 | 0 | 2 | 2 | 0 | -4 |



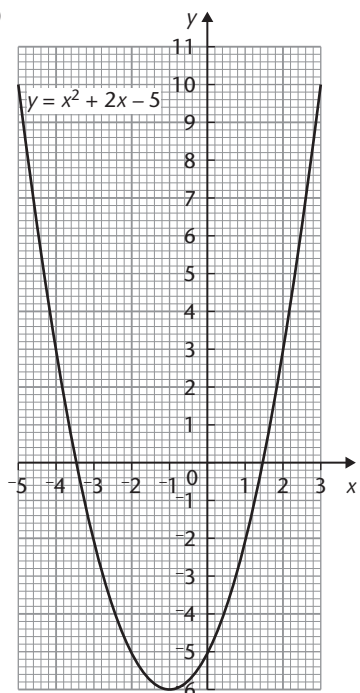
5

| | | | | | | |
|---------------------|----|----|----|----|----|----|
| x | -2 | -1 | 0 | 1 | 2 | 3 |
| $2x^2$ | 8 | 2 | 0 | 2 | 8 | 18 |
| $-3x$ | 6 | 3 | 0 | -3 | -6 | -9 |
| -1 | -1 | -1 | -1 | -1 | -1 | -1 |
| $y = 2x^2 - 3x - 1$ | 13 | 4 | -1 | -2 | 1 | 8 |



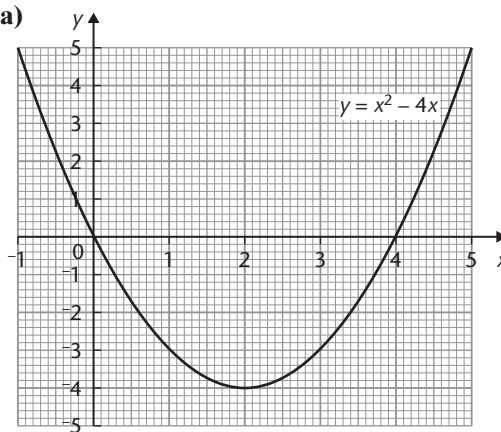
Exercise 11.2H (page 31)

1 a)



b) $x = -3.5$ to -3.4 or $x = 1.4$ to 1.5

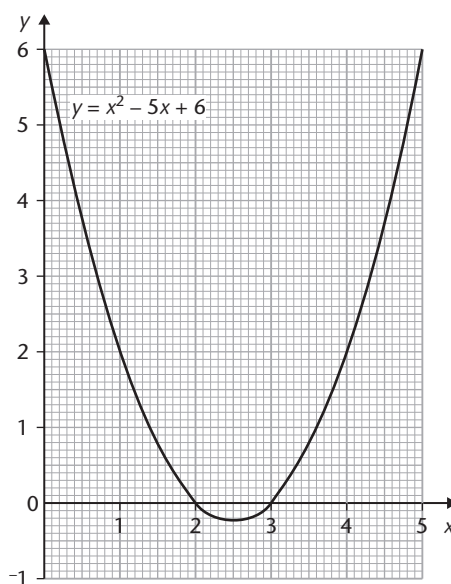
2 a)



b) $x = 0$ or $x = 4$

c) $x = 0.6$ or $x = 3.4$

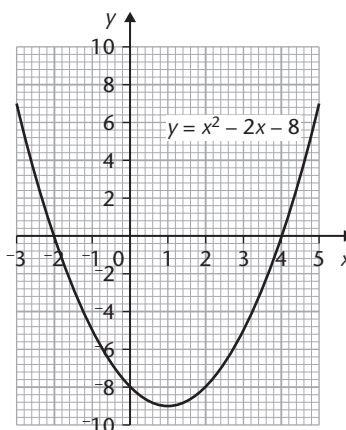
3 a)



b) $x = 2$ or $x = 3$

c) $x = 0.7$ or $x = 4.3$

4 a)



b) $x = -2$ or $x = 4$

c) $x = -2.7$ or $x = 4.7$

d) $x = -1.4$ or $x = 3.4$

12 Finding the mean of grouped data

Exercise 12.1H (page 32)

- 1 5.06
- 2 17.4
- 3 72.2
- 4 7.42
- 5 160
- 6 398.1

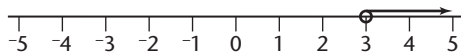
Exercise 12.2H (page 35)

- 1 131.3 cm
- 2 36.4 grams
- 3 111.7 mm
- 4 59.56 minutes
- 5 0.87 m
- 6 44.2 grams
- 7 25.9 minutes
- 8 35.9 mph
- 9 £1562.50
- 10 41.4 seconds

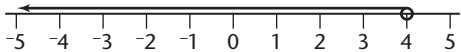
13 Equations and inequalities 1

Exercise 13.1H (page 38)

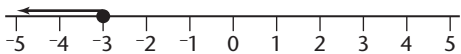
- 1 -5, -4, -3, -2, -1, 0, 1, 2
- 2 $x > 3$



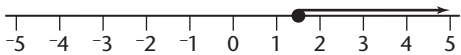
- 3 $x < 4$



- 4 $x \leq -3$



- 5 $x \geq 1.5$



- 6 $x < 2$
- 7 $x \geq -5$
- 8 $x < -9$
- 9 $x > 3$
- 10 $x \geq 5$
- 11 $x > 8$
- 12 $x > 1$
- 13 $x \leq 9$
- 14 $x \leq 2$
- 15 $x > 6$

Exercise 13.2H (page 38)

- 1 a) $60x \leq 500$
b) $x \leq 8.33\dots$ so the maximum number of pens she can buy is 8.
- 2 a) $x + 3x = 24$
b) $x = 6$ so the numbers are 6 and 18.
- 3 a) $2x + 11 = 37$
b) $x = 13$
- 4 $3 + 2x \leq 20, x \leq 8.5$, so Bob can make 8 sandwiches.
- 5 a) $40 + 24x$
b) $40 + 24x = 136, x = 4$, so the job took 4 hours.
- 6 $2x + 3 \geq 56, x \geq 26.5$, so Alicia must buy 27 fence panels.

14 Compound measures

Exercise 14.1H (page 40)

- 1 45 mph
- 2 12 g/cm^3
- 3 537.5 people per km^2
- 4 1156.3 people per km^2
- 5 1320 m
- 6 312.5 seconds
- 7 250 cm^3
- 8 19.3 kg
- 9 a) 8.9 g/cm^3
b) 151.3 g
- 10 a) 60 km/h
b) 64.3 km/h

15 Reciprocals, factors and multiples

Exercise 15.1H (page 41)

- 1 a) $\frac{1}{3}$ b) $\frac{1}{6}$
c) $\frac{1}{49}$ d) $\frac{1}{100}$
e) $\frac{1}{640}$
- 2 a) 16 b) 9
c) 52 d) 67
e) 1000
- 3 a) $1\frac{1}{4}$ b) $2\frac{2}{3}$
c) $\frac{5}{8}$ d) $\frac{3}{10}$
e) $12\frac{1}{2}$
- 4 a) 0.4 b) 5
c) 0.008 d) 6.25
e) 0.3125

Exercise 15.2H (page 42)

- 1 a) (i) 2×7
 (ii) 2^4
 (iii) $2^2 \times 7$
 (iv) 5×7
 (v) $2 \times 3 \times 7$
- b) (i) 7
 (ii) 336
 (iii) 2
 (iv) 140
- 2 a) (i) 7^2
 (ii) $2^2 \times 3^3$
 (iii) $2^2 \times 3 \times 13$
 (iv) $3^2 \times 5^2$
 (v) $2^3 \times 53$
- b) (i) 1
 (ii) 1404
 (iii) 3
 (iv) 95400
- 3 a) $84 = 2^2 \times 3 \times 7$; $154 = 2 \times 7 \times 11$;
 HCF = 14; LCM = 924
- b) $75 = 3 \times 5^2$; $135 = 3^3 \times 5$; HCF = 15;
 LCM = 675
- 4 a) HCF = 1; LCM = 680
 b) HCF = 13; LCM = 884
 c) HCF = 7; LCM = 1078

16 Circles and tangents**Exercise 16.1H (page 43)**

- 1 a) 12π b) 49π
 c) 144π d) $7 \cdot 6\pi$
 e) 121π
- 2 a) 19π b) 45π
 c) 48π d) 126π
 e) 9
- 3 30π cm
 4 9:4
 5 $(144\pi - 25)$ cm²

Exercise 16.2H (page 44)

- 1 a) 32° b) 58°
 2 104°
 3 a) 21° b) 138°
 4 6.63 cm

17 Changing the subject of a formula**Exercise 17.1H (page 45)**

- 1 a) $b = 180 - a - c$
 b) $y = \frac{x-z}{5}$
 c) $h = \frac{2A}{b}$
 d) $n = \frac{a+360}{180}$ or $n = \frac{a}{180} + 2$
 e) $t = \frac{p-c}{3}$
 f) $q = \frac{A-pr}{p}$ or $q = \frac{A}{p} - r$
 g) $g = \frac{p+2f}{2}$
 h) $n = \frac{Ft-m}{4}$
- 2 a) 140°F
 b) $C = \frac{5}{9}(F+40) - 40$
 c) 36.7°C
- 3 a) 201 cm^2 (to the nearest whole number)
 b) $r = \sqrt{\frac{A}{4\pi}}$
 c) 3.42 cm (to 2 d.p.)

18 Equations and inequalities 2**Exercise 18.1H (page 46)**

- 1 $x = 6$
 2 $x = 4$
 3 $x = 16$
 4 $x = 3$
 5 $x = 7$
 6 $x = 1$
 7 $x = 15$
 8 $x = 1$
 9 $x = 14$
 10 $x = 5$
 11 $x = 3$
 12 $x = 3$
 13 $x = 2$
 14 $x = 10$
 15 $x = 3$
 16 $x = 2$
 17 $x = 10$
 18 $x = -2$
 19 $x = 4.1$
 20 $x = 3.7$

Exercise 18.2H (page 46)

- 1 $x > 3$
- 2 $x < 2$
- 3 $x \geq 3$
- 4 $x \leq 2.5$
- 5 $x \geq 2$
- 6 $x \geq 4$
- 7 $x < 3$
- 8 $x \geq 3$
- 9 $x < -4$
- 10 $x \leq 5$
- 11 $x > 6$
- 12 $x > 2.5$
- 13 $x \leq 5$
- 14 $x > 3$
- 15 $x \geq 2$

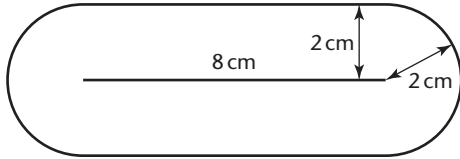
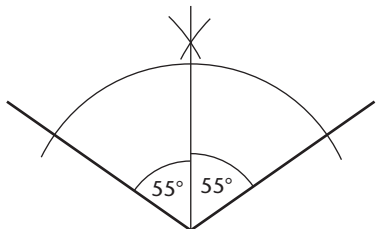
Exercise 18.3H (page 47)

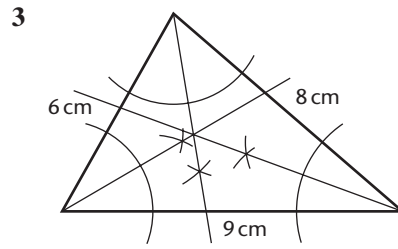
- 1 $3x - 6 = 18, x = 8$
- 2 $3x - 5 = 10, x = 5$
- 3 $10x + 5 = 95, x = 9$
- 4 $2x = -52, x = -26$
- 5 $3x = 9, x = 3$
- 6 $3x = 150, x = 50$ so the angles of the triangle are $50^\circ, 60^\circ$ and 70° .
- 7 $x + 7 = 2x - 8, x = 15$
- 8 $2x + 2(2x - 9) = 12, x = 5$ so the dimensions of the rectangle are 5 cm and 1 cm.

19 Loci

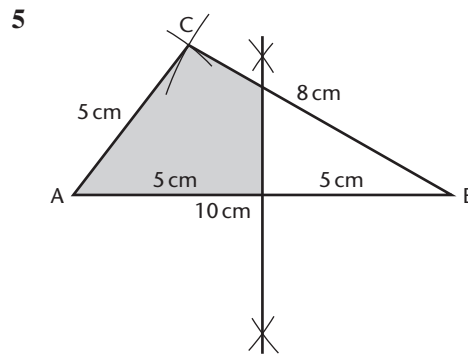
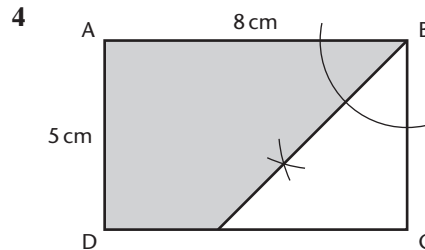
Check students' drawings.
The diagrams in these answers are shown half-size but the dimensions given are those students should have used.

Exercise 19.1H (page 48)

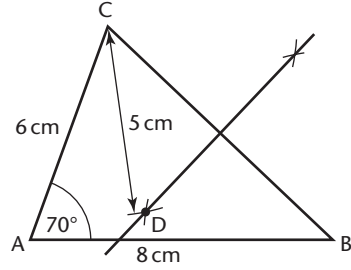
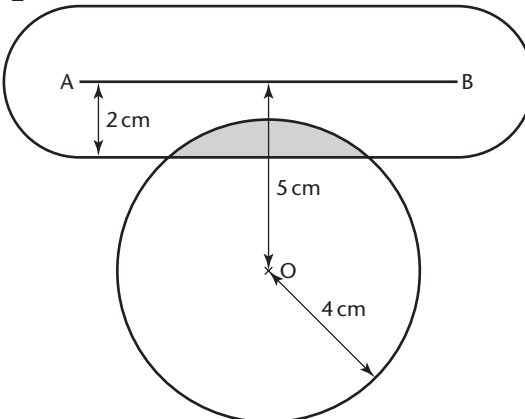
- 1 
- 2 

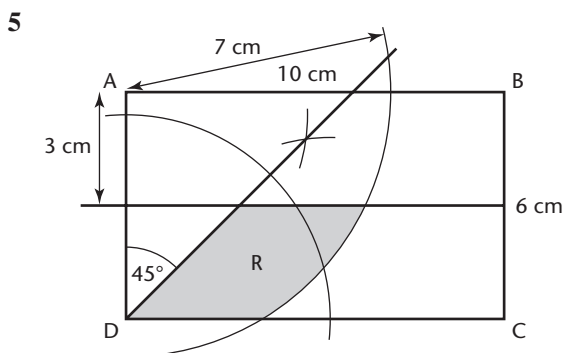
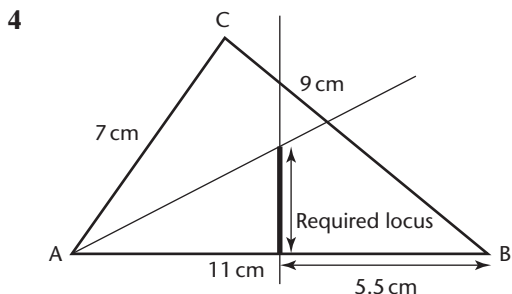
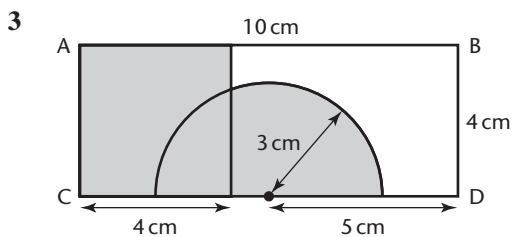


All three bisectors go through the same point.



Exercise 19.2H (page 49)

- 1 
- 2 



20 Decimals

Exercise 20.1H (page 50)

- 1 a) 14.4 b) 34.8
 c) 0.35 d) 14.72
 e) 7.74 f) 82.36
 g) 48.98 h) 91.59
 i) 2.092 j) 5.58
 k) 33.0624 l) 5.785
- 2 a) 5.9 b) 7.8
 c) 54 d) 82
 e) 73 f) 46
 g) 7.8 h) 6.9
 i) 4.3 j) 2.1
 k) 45.3 l) 9

Exercise 20.2H (page 50)

- 1 0.37
 2 0.6
 3 0.6
 4 0.15
 5 0.125
 6 0.2
 7 0.4375
 8 0.26

- 9 0.621
 10 0.332
 11 0.344
 12 0.90
 13 0.93
 14 0.162
 15 $\frac{4}{11}, \frac{2}{5}, \frac{3}{7}, \frac{9}{19}, \frac{1}{2}, \frac{9}{16}$

Exercise 20.3H (page 50)

- 1 $\frac{23}{100}$
 2 $\frac{3}{5}$
 3 $\frac{19}{20}$
 4 $\frac{1}{125}$
 5 $\frac{1}{25}$
 6 $\frac{7}{40}$
 7 $\frac{1}{3}$
 8 $\frac{5}{9}$
 9 $\frac{1}{90}$
 10 $\frac{1}{15}$

21 Accuracy

Exercise 21.1H (page 51)

- 1 a) Continuous
 b) Continuous
 c) Discrete
 d) Discrete
 e) Continuous

2

| Discrete | Continuous |
|----------------|------------|
| 6 GCSEs | 1.93 m |
| £180 | 74 kg |
| 4 friends | 3.7 km |
| 432 passengers | 20 minutes |
| | 32 litres |
| | 907 km/h |

Exercise 21.2H (page 52)

- 1 a) (i) 14.5 cm, 15.5 cm
 (ii) 89.5 cm, 90.5 cm
 (iii) 299.5 cm, 300.5 cm
 (iv) 2.165 m, 2.175 m
 b) (i) 0.15 cm, 0.25 cm
 (ii) 5.85 cm, 5.95 cm
 (iii) 5.95 cm, 6.05 cm
 (iv) 3.1615 m, 3.1625 m
 c) (i) 85 cm, 95 cm
 (ii) 195 cm, 205 cm
 (iii) 5.25 m, 5.35 m
 (iv) 150 mm, 250 mm

- d) (i) 9.825 seconds, 9.835 seconds
 (ii) 87.075 seconds, 87.085 seconds
 (iii) 23.795 seconds, 23.805 seconds
- 2 a) 4.25 cm, 4.35 cm
 b) 462.5 ml, 463.5 ml
 c) 10.45 seconds, 10.55 seconds
 d) 77.5 kg, 78.5 kg
 e) 5.45 m^2 , 5.55 m^2
 f) 141.5 cm, 142.5 cm
 g) 74.95 cm, 75.05 cm
 h) 7.825 mm, 7.835 mm

22 Indices

Exercise 22.1H (page 53)

- | | |
|---------------|--------------------------------|
| 1 a) 2^4 | b) $2^2 \times 3^2 \times 5^3$ |
| c) a^5 | |
| 2 a) 2^{11} | b) 3^8 |
| c) 4^5 | d) 5^7 |
| 3 a) 5^3 | b) 7^6 |
| c) 2^2 | d) 3^4 |
| 4 a) 2^6 | b) 3^0 or 1 |
| c) 5^4 | d) 7^1 or 7 |
| 5 a) $2a^6$ | b) a^2 |
| c) $12a^5$ | d) $3a$ |

Exercise 22.2H (page 54)

- | | |
|---------------------|-----------|
| 1 a) 81 | b) 4900 |
| c) 13 | |
| 2 a) 15 | b) 40 |
| c) 83 | |
| 3 a) 1 | b) 8 |
| c) 54 | |
| 4 a) 3 | b) 100 |
| c) 62 | |
| 5 64 cm^3 | |
| 6 a) 400 | b) 1764 |
| c) 26.01 | d) 3600 |
| e) 0.81 | |
| 7 a) 30 | b) 8.66 |
| c) 16.85 | d) 178 |
| e) 201 | |
| 8 a) 343 | b) 42.875 |
| c) 830.584 | d) 8000 |
| e) 1 000 000 | |
| 9 a) 9 | b) 5.24 |
| c) 2.1 | d) 16.92 |
| e) 46.42 | |
| 10 8.94 cm | |

23 Trial and improvement

Exercise 23.1H (page 55)

- 1 0 is between -2 and 3 so one solution is between 1 and 2.
 $x = 1.6$
- 2 0 is between -3 and 3 so one solution is between 0 and 1.
 $x = 0.6$
- 3 0 is between -10 and 4 so one solution is between -3 and -2.
 $x = -2.4$
- 4 0 is between 2 and -2 so another solution is between 0 and 1.
 $x = 0.4$

24 Sequences

Exercise 24.1H (page 56)

- 1 Linear; 20, 24
 2 Not linear; 31, 30
 3 Linear; 16, 13
 4 Not linear; 27, 38
 5 Linear; 33, 41

Exercise 24.2H (page 56)

- 1 7 8 9 10
 2 6 12 18 24
 3 -1 0 1 2
 4 5 8 11 14
 5 -5 -3 -1 1
 6 1 4 7 10
 7 8 12 16 20
 8 -1 -2 -3 -4
 9 7 12 17 22
 10 -1 -3 -5 -7

Exercise 24.3H (page 56)

- 1 $2n$
 2 $3n + 1$
 3 $3n - 3$
 4 $n + 20$
 5 $4n - 3$
 6 $3n + 7$
 7 $2n - 5$
 8 $30 - 5n$ or $-5n + 30$
 9 $6 - 2n$ or $-2n + 6$
 10 $4 - n$ or $-n + 4$

25 Multiplying out two brackets

Exercise 25.1H (page 57)

- 1 $x^2 + 3x + 2$
- 2 $x^2 + 7x + 12$
- 3 $x^2 + x - 2$
- 4 $x^2 + 2x - 15$
- 5 $x^2 - 3x + 2$
- 6 $x^2 - 4x - 5$
- 7 $x^2 - 9$
- 8 $x^2 + 4x + 4$
- 9 $x^2 - 14x + 49$
- 10 $x^2 - 21x + 108$

26 Prisms and units

Exercise 26.1H (page 58)

- 1 a) 914.62 cm^3
b) 815.08 cm^3
c) 1163.37 cm^3
d) 691.04 cm^3
e) 2244.34 cm^3
f) 4954.56 cm^3
- 2 62.8 cm^3
- 3 a) 477.75 cm^3
b) 3366 cm^3
- 4 10000 cm^3
- 5 3.18 cm
- 6 2.54 cm

Exercise 26.2H (page 59)

- 1 181 cm^2
- 2 287 cm^2
- 3 528 cm^2
- 4 471 cm^2

Exercise 26.3H (page 60)

- 1 a) 250 mm b) 2400 cm
c) 13.6 mm d) 151 mm
e) 235 mm
- 2 a) 20000 cm^2 b) 300 mm^2
c) 11200 m^2 d) 5 mm^2
e) 2000000 mm^2
- 3 a) 80 cm^2 b) 840 cm^2
c) 200 m^2 d) 1800 m^2
e) 6.4 m^2
- 4 a) 32000 mm^3 b) 24000000 cm^3
c) 5200 mm^3 d) 420000 cm^3
e) 20 mm^3
- 5 a) 5.2 m^3 b) 270 cm^3
c) 0.00021 m^3 d) 840000000 mm^3
e) 0.17 cm^3
- 6 a) 36000 cm^3 b) 6.3 litres
c) 1400 ml d) 0.061 litres
e) 5.4 litres
- 7 50 cm
- 8 1000000 or 10^6