Cambridge Checkpoint Lower Secondary Mathematics Workbook 8 (2021) Answers

Section 1

1 Multiplication and division

Workbook answers

Exercise 1.1 (page 2)

1 a 150 b 155
c 1200 d 305
2 a 210 b 213
c 2263 d −23 360
3 Students to complete missing boxes with calculations that are equivalent to the calculations they have been paired with. There are multiple answers.

52 × 30	−14 × −140
−13 × 25	−250 × 1.3
32 × −6	83 × −12
	104 × 15
280 × 7	

Exercises 1.3–1.5 (page 2)

1 a 3^4 b 2^3
c $4^2 \times 5^4$ d $2^3 \times 5^2$
2 a 6 × 6 × 6
b 8 × 8 × 8 × 8 × 8
c 10 × 10
3 a 5^6 b 3^{10}
c 7^3 d 6^4
4 a 3^6 b 5^{12}
c 7^6 d 2^9
5 4^4
6 7 hours

Exercise 1.2 (page 2)

1 a 8 b −8 c −7
2 a 17 b −8.5 c −8.5
3 3000 cm ÷ 50 = 60 cm

2 Hierarchy of quadrilaterals

Workbook answers

Exercises 2.1–2.2 (page 4)

1 a Square, rectangle, rhombus, parallelogram, isosceles trapezium
b Square, rectangles, rhombus, parallelogram
c Square, rhombus
2 a Adjacent
b Congruent
c Congruent, parallel
d Diagonals
3

	All sides are equal	At least one pair of equal sides	A least one pair of parallel sides	Two pairs of parallel sides	All angles are equal	Opposite angles are equal	Diagonals bisect perpendicularly
Square	✓	✓	✓	✓	✓	✓	✓
Rectangle		✓	✓	✓	✓	✓	
Parallelogram		✓	✓	✓		✓	
Rhombus	✓	✓	✓	✓		✓	✓
Trapezium			✓				
Kite		✓					✓

4 a Square, rhombus
b Square
c Square, rectangle, parallelogram, rhombus
d Square, rectangle

3 3 Data collection and sampling methods

Workbook answers

Exercises 3.1–3.4 (page 6)

1

Hair colour	Male	Female	Total
Black	1	1	2
Brown	3	0	3
Blonde	2	3	5
Ginger	0	2	2
Total	6	6	12

2 68.5 kg

3 a **Categorical**. The people were categorised as either male or female.
b **Continuous**. Masses can be any number, including decimals.
c **Discrete**. Ages are usually just given in years.
d **Categorical**. Hair colours were categorised as black, brown, blonde or ginger.

4 a These names will differ as the sample is random.
b For example, put the names of the people in a hat and draw out 6 names.

c Student should have added up all the masses of their sample and divided the total by 6.
d A comparison of their mean and the mean 68.5 kg.

5 a They could ask every third person to walk into the gym.
b They could select students at random from each year group.
c They could randomly select people from their addresses.

Exercise 3.5 (page 8)

1 Question should not be biased; answers should not be subjective, and the answer boxes should be exhaustive. An example could be:
How often do you visit the library in a month?

Never ☐
Once ☐
Twice ☐
Three times ☐
More than three times. ☐

2 a **Biased**. He has said that most people love using the artificial pitch so this might influence people to say they wished they used it more often.
b Answer boxes are subjective. Someone might think that visiting the shop twice a week is 'sometimes', whereas someone else might class that as 'often'.

3 a Make sure the sample includes a random sample of students from all year groups.
b Question should not be biased; answers should not be subjective, and the answer boxes should be exhaustive.

4 Parallelograms, trapezia and circles

Workbook answers

Exercise 4.1 (page 9)

1 a 40 cm^2
b 31.5 mm^2
c 75 cm^2

2 a 5.6 cm
b 2.3 mm

3 Parallelogram: 7 cm
Trapezium: 30 cm
Triangle: 5.6 cm

Exercise 4.2 (page 10)

1 a 11.31 mm (to 2 d.p.)
b 54.04 m (to 2 d.p.)

2 a 28.27 cm (to 2 d.p.)
b 45.87 mm (to 2 d.p.)

3 6 cm

4 a $170.81
b 23 cm (to the nearest cm)

5 7 cm

5 Order of operations

Workbook answers

Exercise 5.1 (page 12)

1 a 34
b 3
c 18
d 27
2 a 45
b 6
c 96
d 7
3 a $4 \times (2 + 5) = 28$
b $(6 + 3) \times 5 = 45$
c $12 \times (5 - 2) \div 9 = 4$
d $(5 - 2) \times 7 + 9 = 30$
4 a $5 \times 6 + 7 = 37$
b $5 + 6 \times 7 = 47$
c $15 + 8 \times 9 = 87$
d $4 \times 4 + 7 \times 2 = 30$

Exercises 5.2–5.3 (page 12)

1 a $\sqrt{36}$
b $\sqrt[3]{27}$
c $\sqrt[3]{64}$
2 a 23
b 41
c 5
d 44.5
3 a i They have done $4 + 3$ first and not 3×6.
ii 22
b i They have not found the answer to what is in the brackets first and have only squared the 3.
ii 111

6 Expressions, formulae and equations

Workbook answers

Exercise 6.1 (page 13)

1 a 14
b 9
c 363
d 23
2 a $2(b + 5)$
b $\frac{20 - h^2}{2}$
3 a Each face on a cuboid is a rectangle. The front and back faces are equivalent, the two side faces are equivalent and the top and bottom faces are equivalent. The area of the front is mn, the area of a side is mp and the area of the top is np. Each of these are multiplied by two to give the total surface area.
b $104\ \text{cm}^2$
4 a $g^2 - hr$
b $h = 4$
$g = 10$
$r = 3$
There are other values this is just an example.

Exercise 6.2 (page 14)

1 a Equation
b Equation
c Expression
d Expression
2 a $x = 6$
b $a = 8$
c $y = 4$
d $n = 7$
3 $2b - 3 = 11$, $-b + 10 = 3$, $3b = 21$, $5b - 5 = 30$ can all be solved with $b = 7$
4 a $2(x - 2) + 2(2x + 1) = 25$
b $x = 4.5$
5 a $3a + 3a + 4a + 50 = 180$ or simplified $10a + 50 = 180$
b $a = 13$
c 102°

Exercise 6.3 (page 16)

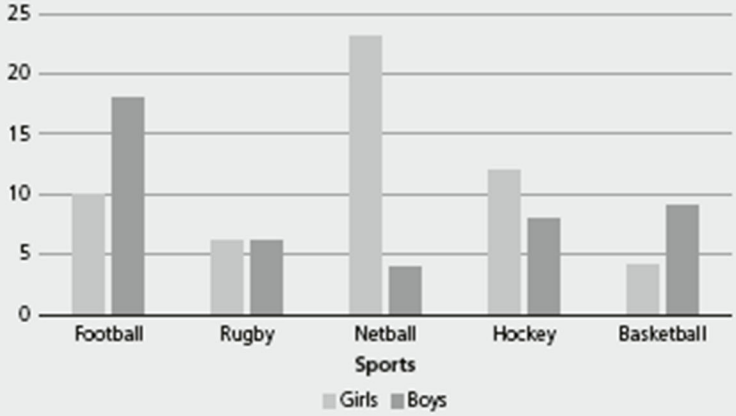
1 a Equation
b Formula
c Equation
d Formula
2 a $a = t - 2r$
b $a = \frac{y}{3}$
c $a = \frac{w + p}{bc}$
3 a 4.8 kilometres
b 20 miles
4 a $T = 75H + 0.8M$
b £482

7 Recording, organising and representing data

Workbook answers

Exercises 7.1–7.3 (page 17)

1 a Netball
b Football
c 12
d 28
e 45
f
i Students may have produced a dual bar chart, like the one shown below.



ii Student's own comparisons

2

3 a Cannot tell because we do not know the total number of students for each pie chart. The proportion of students with brown eyes is higher in group 1 but that does not mean the number of students with brown eyes is higher.
b In group 1, the size of the sector is 50 degrees, in group 2 the size of the sector is 165 degrees. Therefore, there is a greater proportion in group 2.
c Ben is incorrect because pie charts represent proportions and group 2 has a greater proportion of green-eyed students (i.e. the angle of the slice is greater in group 2 than group 1).

Exercise 7.4 (page 19)

1 a

Exam A

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

Key: 2|5 means 25 marks

Exam B

0	
1	0 1 1 2 6 8 8
2	0 2 5 5 6 6 6 7 7 7 8 9
3	0

Key: 2|5 means 25 marks

b Exam A = 18.2, Exam B= 21.7

c Exam A = 17.5, Exam B = 25

d Exam A = 8, 14, 16, 23 and 27, Exam B = 26, 27

e Exam A = 24, Exam B = 20

f Exam B as the mean and median are both higher than in Exam A.

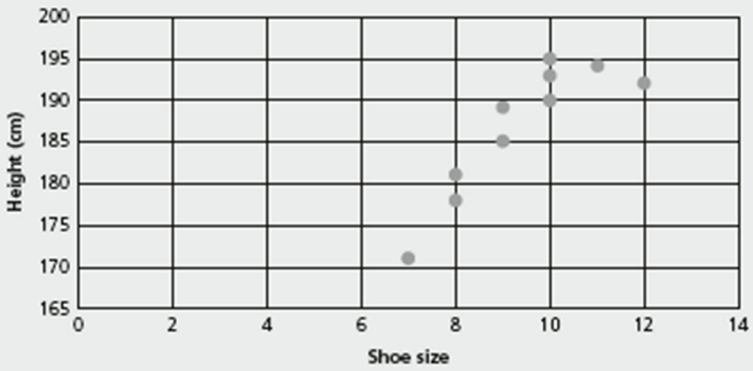
Exercises 7.5–7.6 (page 20)

1 a No relationship between a person's IQ and their house number.

b If the outdoor temperature increases you would expect the sale of barbecues to also increase.

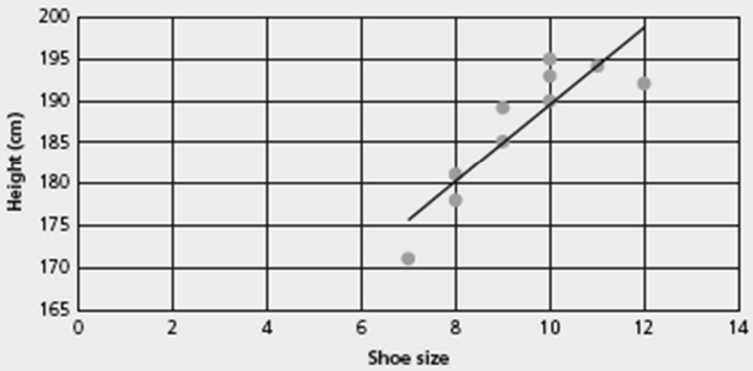
c In general the more you train at a sport the better you get. So we would expect to see the finishing time decreasing (getting faster) as the amount of time spent training increases.

2 a



b As height increases, shoe size aso tends to increase.

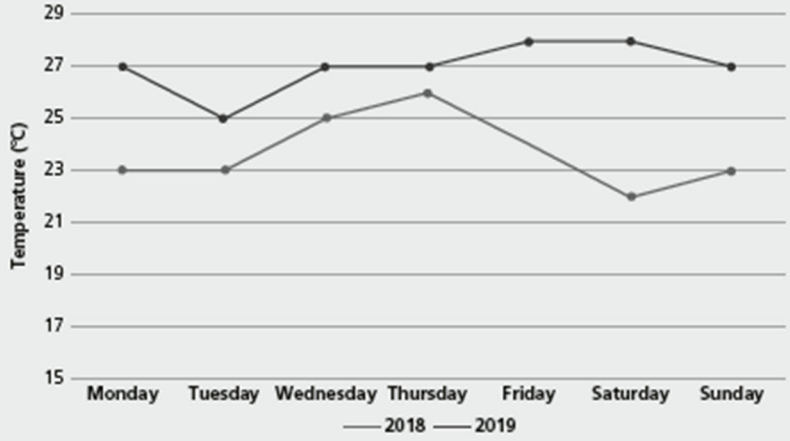
c



d This answer will vary depending on the line of best fit. For this line of best fit, the height is 182 cm.

3 a Time series; two sets of data to compare.

b



c Temperatures in 2019 are higher than temperatures in 2018.

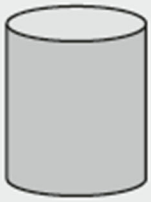
8 Properties of three-dimensional shapes

Workbook answers

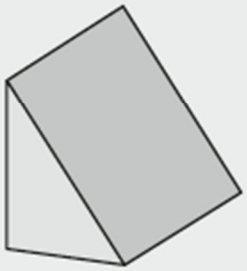
Exercises 8.1–8.2 (page 22)

1 Polyhedron, faces, vertex, cuboid (or any other polyhedron), cylinder (or any other 3D shape with curved faces), because at least one face is not a polygon or is curved.

2 a This is not a polyhedron as the flat faces are not polygons and there is also a curved surface.

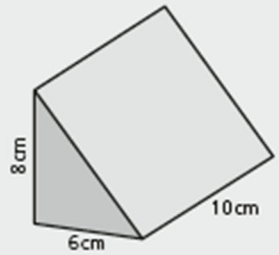


b This is a polyhedron as all the faces are flat polygons. Euler's formula: $5 + 6 - 9 = 2$

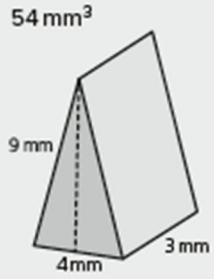


Exercise 8.3 (page 22)

1 a $240\,cm^3$



b $54\,mm^3$

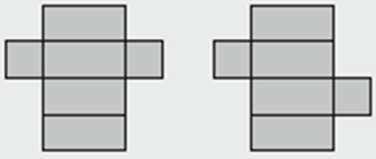


2 25%

3 8.5 cm

Exercise 8.4 (page 23)

1 a Two common answers are as follows; however, there are other possible answers.



b $184\,cm^2$

2 $1738\,mm^2$ or $17.38\,cm^2$

3 \$479.70

9 Factors and multiples

Workbook answers

Exercise 9.1 (page 25)

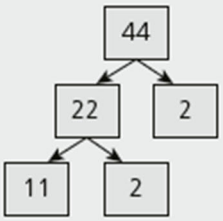
1 a 1, 2, 3, 4, 6, 8, 12, 16, 24, 48
b 1, 2, 4, 7, 8, 14, 28, 56

2 a 4
b 9

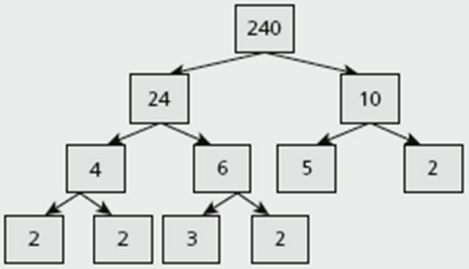
3 a $2^3 \times 3 \times 5$
b 2×5^3

4 HCF = 15, LCM = 360

5
a



b



6 4.5

Exercise 9.2 (page 27)

1 True, false, true, true

2 a Any decimal number
b Any positive integer
c Any integer

3 Student gives an answer which satisfies all conditions, an example is:
−2, 2.5, 4, 5, 7

10 Complementary events

Workbook answers

Exercise 10.1 (page 28)

1 a $\frac{3}{5}$
b $P(B)+P(B')=1$

2 a $\frac{4}{5}$
b $\frac{1}{5}$

3 a Should have coloured 2 counters in blue.
b Should have coloured 6 counters in red.
c All counters should be coloured in green.

4 a i $\frac{3}{5}$
ii $\frac{2}{5}$
iii $\frac{2}{3}$
b 93%
c 0.55

Section 1 – Review

1 a Student's explanation, e.g. $8 \times 4 = 32$ therefore $80 \times 4 = 320$

b Student's explanation, e.g. $(80 \times 4) + (2 \times 4) = 320 + 8 = 328$

c Student's explanation, e.g. two negative numbers multiplied produces a positive answer. Therefore, $-82 \times (-4) = 82 \times 4 = 328$

2 a Parallelogram, rhombus, rectangle and square

b Parallelogram. Student's justification, e.g. all other quadrilaterals in the group have further characteristics which refine their definition.

3 a No, it does not, as only 1 out of the 7 chosen is a boy, yet boys make up half of the population of the table.

b Student's choice. For example, a random sample that reflects the fact that there are equal numbers of boys and girls in the population.

4 a $156\,cm^2$

b A = $12\,cm^2$ B = $24\,cm^2$

5 a 2

b 8

6 a C and r

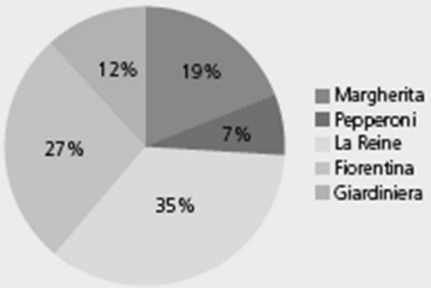
b 2 and π

c 31.8 cm

7 a

Pizza	Frequency	Percentage	Angle
Margherita	57	19%	68.4°
Pepperoni	21	7%	25.2°
La Reine	105	35%	126°
Fiorentina	81	27%	97.2°
Giardiniera	36	12%	43.2°

b



8 a V = vertices (corners); F = faces; E = edges

b $V = 6$; $F = 5$; $E = 9$; $6 + 5 - 9 = 2$

9 a Factor tree for 48 leading to $2^4 \times 3$
Factor tree for 70 leading to $2 \times 5 \times 7$
HCF = 2

b LCM = $2^4 \times 3 \times 5 \times 7 = 1680$

10 $\frac{3}{8}$

Section 2

11 Decimals and place value

Workbook answers

Exercise 11.1 (page 30)

1 a 7000 b 700 c 80
d 7 e 0.5 f 0.09
2 a 8500 b 920 c 5.7
d 0.76 e 25 f 0.010
3 No, the shed could measure 1.15 m in length.
4 83

Exercise 11.2 (page 31)

1 a 2.7 b 16.8 c 0.82 d 0.03
2 a 100 b 8020 c 46 500 d 852 100

Exercises 11.3–11.5 (page 31)

1 a $30 \times 4 = 120$ b $6 \times 8 = 48$ c $30 \times 0.4 = 12$
d $800 \times 2 = 1600$ e $6 \times 0.08 = 0.48$ f $800 \times 20 = 16\,000$
2 a $20 \div 5 = 4$ b $8 \div 2 = 4$ c $16 \div 4 = 4$
d $20 \div 0.05 = 400$ e $8 \div 20 = 0.4$ f $16 \div 0.4 = 40$
3 a 12 000 b 120 c 120
d 1200 e 24 f 24
4 a 190 000 (200 000 to 1 s.f.) b 130 000 (100 000 to 1 s.f.)

12 Comparing and interpreting data

Workbook answers

Exercises 12.1–12.2 (page 33)

1 a Mean: Season 1 = 1.39, Season 2 = 1.69
Median: Season 1 = 1, Season 2 = 2
Mode: Season 1 = 1, Season 2 = 2
Range: Season 1 = 5, Season 2 = 4
b Season 2 has a higher mean, median and mode so the team scored more goals on average in Season 2. The range is lower in Season 2 as well which suggests the team is more consistent.
2 Group A is likely to be the group who run 10 km three times a week as the mean, mode and median are all lower and the range is smaller.
3 The summer months are warmer so people will be more likely to eat on the beach.

13 Transformation of 2D shapes

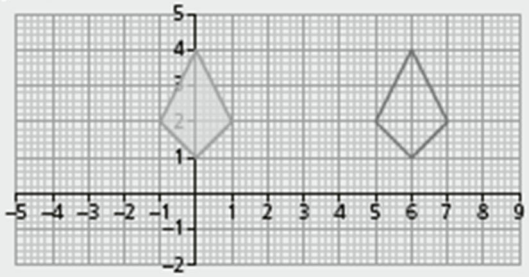
Workbook answers

Exercise 13.1 (page 35)

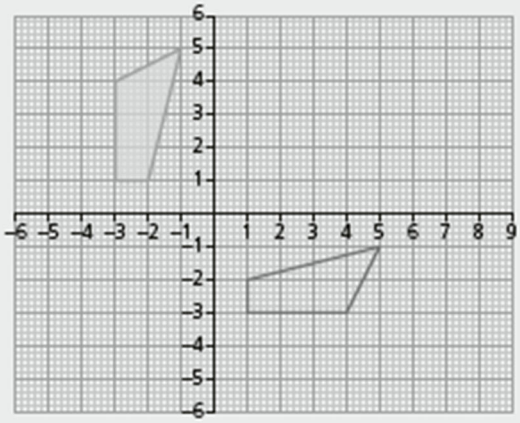
1 a $x = -3$

b $y = x$

2 a



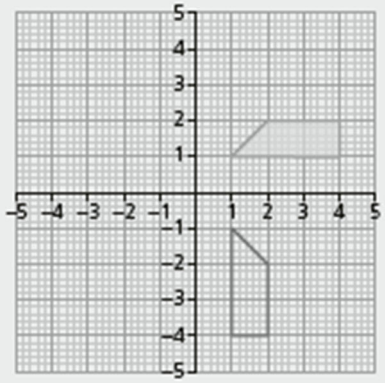
b



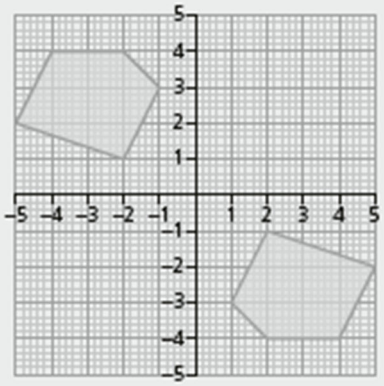
3 a $x = -1$ b $y = 1.5$ c $y = x$

Exercises 13.2–13.3 (page 37)

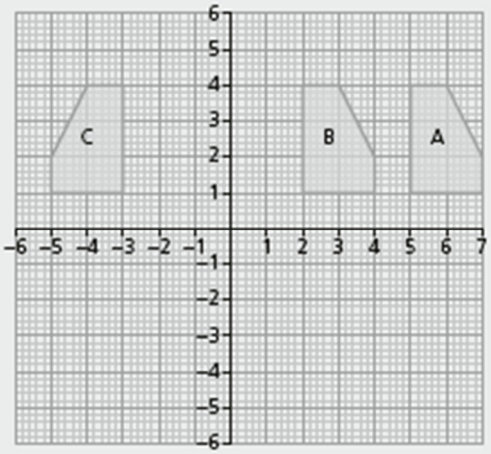
1 a



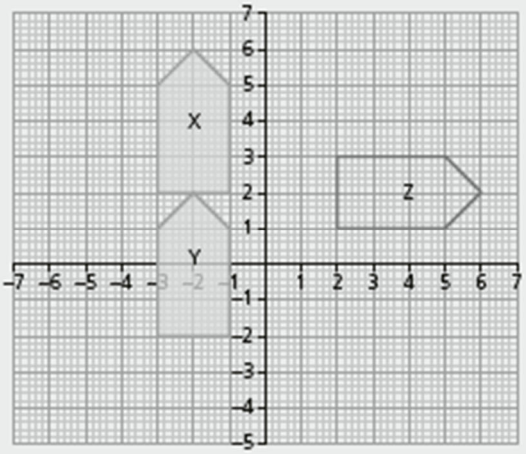
b



2

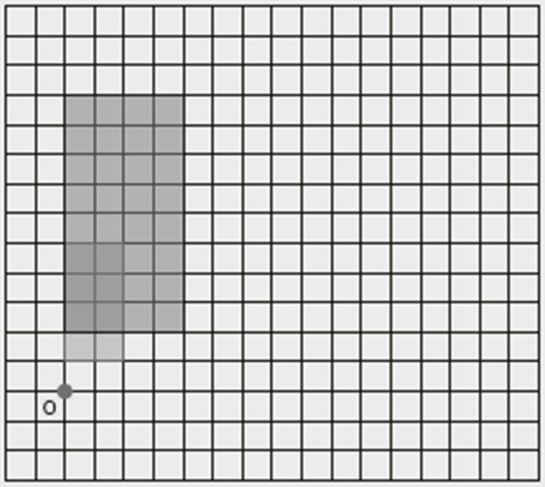


3



Exercise 13.4 (page 39)

1



2 3

3 Centre of enlargement: (1,2)
Scale factor: 2

14 Fractions and decimals

Workbook answers

Exercises 14.1–14.2 (page 41)

1 a Terminating = 0.25
b Recurring = $0.\dot{6}$
c Terminating = 0.625

2 a $0.1\dot{6}$
b The calculator gives the decimal as 0.1666666667 as it has rounded the last digit that can fit on the screen.

3 a $6 \times 4 = 24$
b $14 \times 5 = 70$
c $3.2 \times 10 - 3.2 \times 0.1 = 31.68$

Exercise 14.3 (page 41)

1 a $3\frac{2}{7}$ b $\frac{12}{5}$ c $2\frac{1}{2}$ d $\frac{28}{5}$

2 a $5\frac{4}{5}$ b $8\frac{2}{7}$ c $3\frac{1}{4}$ d $6\frac{1}{3}$

3 a $3\frac{11}{20}$ m b $3\frac{1}{8}$ m

4 Total of each pair = $8\frac{1}{12}$

$6\frac{1}{2}$ and $1\frac{7}{12}$ $5\frac{1}{2}$ and $2\frac{7}{12}$

$3\frac{1}{3}$ and $4\frac{3}{4}$

Exercise 14.4 (page 43)

1 a $16\frac{2}{3}$ b 216

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

3 a $17\frac{1}{2}$ b 24

4 a $7\frac{13}{20}$ b $2\frac{47}{60}$

15 Manipulating algebraic expressions

Workbook answers

Exercise 15.1 (page 44)

1 a $12b^2+18b$
b $2d^2+2de$
c $6r^3-3pr$
d $5w^2y-10w^3$

2 a $6a+11$
b $6h+32$
c $-10k-14$

3 a $3a(5a+2)$
b $a=2$, so base = 12 and height = 6

4 a $3b^2+4.5b$
b $27b^2+4.5b$

Exercises 15.2–15.5 (page 45)

1 a $2(2a+3)$
b $10(2g+1)$
c $7(k-4)$
d $8(3f-2b)$

2 a $d(3+5a)$
b $d(3f+5-7e)$
c $p(8p-11a)$
d $r(pq-r)$

3 a $4a(3b+4)$
b $9p(n-3)$
c $5d(3d-2)$
d $10n^2(2-n)$

4 a $4a+10$
b Student must give two expressions which multiply together to give $8a+20$.
Some common examples are:
1 by $8a+20$
4 by $2a+5$

5 a Manuela has calculated the perimeter.
b $2(19b+3)$

16 Combined events

Workbook answers

Exercise 16.1 (page 47)

1 a

		Coin	
		Heads	Tails
Card from spades suit	Ace	A H	A T
	2	2 H	2 T
	3	3 H	3 T
	4	4 H	4 T
	5	5 H	5 T
	6	6 H	6 T
	7	7 H	7 T
	8	8 H	8 T
	9	9 H	9 T
	10	10 H	10 T
	Jack	J H	J T
	Queen	Q H	Q T
	King	K H	K T

b $\frac{1}{26}$ c $\frac{5}{26}$

2 a

+		Dice 2				
		1	2	3	4	5
Dice 1	1	2	3	4	5	6
	2	3	4	5	6	7
	3	4	5	6	7	8
	4	5	6	7	8	9
	5	6	7	8	9	10

b 25
c 6
d $\frac{1}{25}$

3 a Space diagrams are only useful when you have two events; here three events have taken place.
b $\frac{3}{216}$

17 Constructions, lines and angles

Workbook answers

Exercises 17.1–17.3 (page 49)

1 Students to construct the triangles accurately, showing all construction lines.
2 Students to construct the triangles accurately, showing all construction lines
3 Cannot be constructed as the angles already sum to over 180 degrees.
4 Cannot be constructed as the two shorter sides sum to equal the same length as the longest side.

Exercises 17.4–17.5 (page 50)

1 Students to construct the triangles accurately, showing all construction lines.
2 Students to construct the perpendicular bisector of each line, showing all construction lines.
3 a–c Students to construct the perpendicular bisector of each line, showing all construction lines.
d Yes, the centre of the circle is where all the perpendicular bisectors meet.

Exercise 17.6 (page 52)

1 Students to bisect each angle, showing all construction lines.

Exercises 17.7–17.8 (page 52)

1 $a = 107^\circ$ angles on a straight line sum to 180°.
$b = 73^\circ$ vertically opposite to 73°.
$c = 107^\circ$ vertically opposite to a.
2 $u = 120^\circ$ corresponding to z.
$w = 120^\circ$ corresponding to z.
$y = 60^\circ$ angles on a straight line sum to 180°.
$z = 120^\circ$ vertically opposite $2y$.
3 $a = 20^\circ$ supplementary angles sum to 180°.
$b = 80^\circ$ corresponding to $4a$.

Exercises 17.9–17.10 (page 53)

1 $j = 18^\circ$ and $h = 162^\circ$.
2 $t = 113^\circ$ as angles on a straight line sum to 180°
$u = 33.5^\circ$, $s = 33.5^\circ$ angles in a triangle sum to 180° and as it is isosceles s and u are equal.
3 $k = 30^\circ$ so the four angles are 120°, 90°, 90° and 60°.

18 Algebraic expressions and formulae

Workbook answers

Exercise 18.1 (page 55)

1 a $8n + 5$
b $3n^2 + 7.5n$
c Perimeter = 37 units, Area = 78 units^2
2 a $15x^3 - 9x^2$
b $46x^2 - 24x$
c Incorrect. x cannot be any negative integer as lengths cannot be negative.
3 a $N + 5$
b 7

Exercise 18.2 (page 56)

1 a Option 1: $C = 1.2d + 3$
Option 2: $C = d + 3.5$
b Option 2; it costs \$14 compared to \$15.60 for option 1.
2 a £3900
b £12 500

19 Probability experiments

Workbook answers

Exercise 19.1 (page 58)

1 a Depending on results, students will state either biased or unbiased. However, it will be difficult to tell with such a small number of trials.
b Students will complete this based on their own experiment.

2 a Students to make their spinner using the template.
b Students to label each section with the numbers 1–8 in any order.
c Students will complete this based on their own experiment.

20 Equations and inequalities

Workbook answers

Exercise 20.1 (page 60)

1 a $a = 6$ b $d = -4$
c $h = -4$
2 a $g = 12$ b $n = 24$
c $b = 1$ d $t = 5$
3 a $m = -7$ b $p = 7$
c $u = -1.5$

Exercise 20.2 (page 61)

1 a $15 - n = 9$ so $n = 6$
b $2(5 + n) = 16$ so $n = 3$
c $4(2 + n) = 5(n - 3)$ so $n = 23$

Exercise 20.3 (page 61)

1 a $a = 3.5$
b 90

2 Lauren = 27, Georgina = 6, Mia = 14

Exercises 20.4–20.5 (page 62)

1 a a is less than 7
b b is greater than or equal to 5
c c is not equal to 9
2 a 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
b 12, 11, 10, 9, 8, 7, 6, 5
c −8, −7, −6, −5, −4, −3, −2
3 There are other possible answers; the answers below are only examples.
$-5 \leqslant c \leqslant 0$
$-5 \leqslant c < 1$

Section 2 – Review

1 No, because 449 is the maximum number of tickets they could have sold.

2 a It depends on what is meant by average. Class X's mean and median are greater than Class Y's, but their mode is less.

b Class X is more likely to be the one set by ability as the results show class X has a smaller range of results.

3 $y = 3$ and $x = -1$

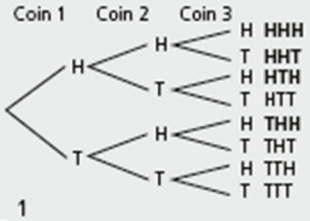
4 a $3\frac{1}{5}$ and $\frac{16}{5}$ $5\frac{1}{5}$ and $\frac{26}{5}$ $5\frac{4}{5}$ and $\frac{29}{5}$

b $2\frac{2}{5} = \frac{12}{5}$

c $\frac{8}{5} = 1\frac{3}{5}$

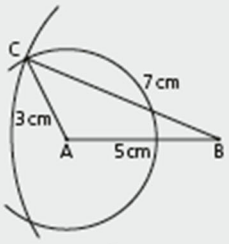
5 $4m(3m+2)$

6 a & b



c $\frac{4}{8} = \frac{1}{2}$

7 a



b

8 a $\frac{13}{2}m + 11$

b i $m = 2$

ii 6 kg, 8 kg and 10 kg

9 a Four flips of a coin is not enough times to determine whether it is biased.

b Yes, by flipping the coin a large number of times.

10 $2(x+4) = 4x - 2$

$x = 5$

Section 3

21 Describing sequences

Workbook answers

Exercise 21.1 (page 63)

1 a $3\frac{1}{4}$, $3\frac{1}{2}$, $3\frac{3}{4}$
b 6, 3, 1.5
c $-4\frac{1}{3}$, 5, $-4\frac{1}{3}$
2 a 6, 10, 14, 18, 22
b 2, 5, 8, 11, 14
c −4, −2, 0, 2, 4
3 a 16, 32; 10th term = 20
b $\frac{3}{5}$, $\frac{2}{5}$; 10th term = $-\frac{2}{5}$
c 80, −160; 10th term = −2560
4 a 17
b Number of squares
= pattern number × 2 + 1
c 10th
d No, as all patterns have an odd number of squares.

Exercise 21.2 (page 64)

1 a nth term = $3n + 1$
50th term = 151
b nth term = $4n - 10$
50th term = 190
c nth term = $2.5n - 1.5$
50th term = 123.5
2 Both sequences have the number 26 in them, when $n = 5$.
3 a Students should draw the next two cuboids. The second cuboid is 4 cubes high and 2 cubes wide. The third cuboid is 5 cubes high and 3 cubes wide.
b No, you need 255 cubes to make cuboid 15. It will be 17 cubes high and 15 cubes wide. $17 \times 15 = 255$.

22 Percentage increases and decreases

***Workbook* answers**

Exercise 22.1 (page 66)

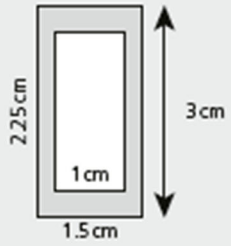
1 a 180
b 896
c 748.8
d 39.2
2 a Shop A; selling for $405 compared to $434
b $135
3 $158
4 11.2 m below sea level
5 98.4% increase

23 2D representations of 3D shapes

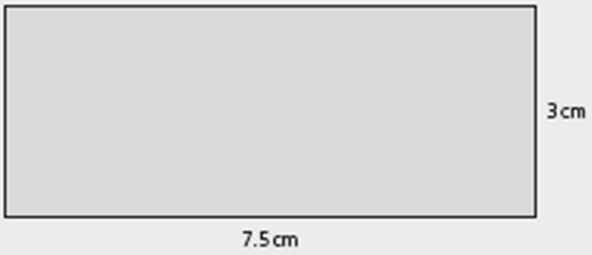
Workbook answers

Exercise 23.1 (page 68)

1 Front:

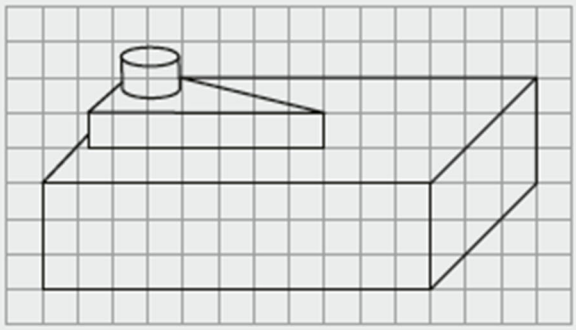


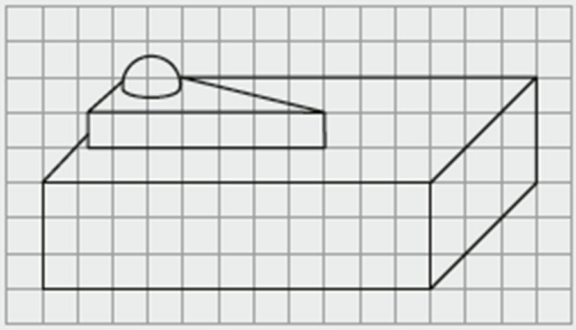
Side:



Plan:

2 a Two possible sketches could be:





b Depends on student's answer.

c Depends on student's answer.

24 Functions

Workbook answers

Exercise 24.1 (page 70)

1 a

b

2

Input	Output
−2	2
−1	2.5
0	3
1	3.5
2	4

3

Input	Output
−2	−4
26	10
−10	−8
7	0.5
6	0

4 a $y = 2x - 5$

b $y = 2(x + 7)$

c $y = \frac{x + 5}{8}$

Exercise 24.2 (page 73)

1 a

b $C = 2.5n + 50$

c $100

d 32 people

2 a

b 190 white tiles

c

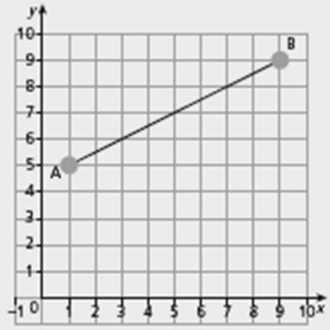
d 95 grey tiles

25 Geometry and translations

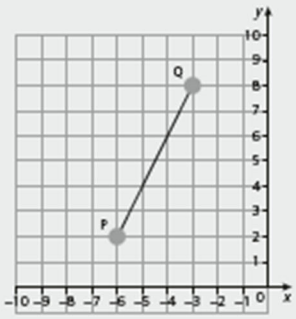
Workbook answers

Exercise 25.1 (page 73)

1 a Midpoint = (5, 7)



b Midpoint = (−4.5, 5)



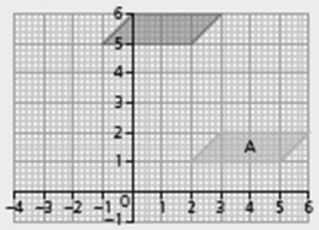
2 (3, 9)

3 P = (−10, −1), Q = (−10, 9), R = (6, 9)

Exercise 25.2 (page 74)

1 $\begin{pmatrix} 4 \\ 2 \end{pmatrix}$

2



3 $\begin{pmatrix} -2 \\ 5 \end{pmatrix}$ G to F reverses the direction so instead of going 2 to the right and 5 down, you get back to F. You have to go 2 to the left and 5 up.

4 J' = (0, 2)
K' = (−2, −1)
L' = (2, −4)

26 Squares, square roots, cubes and cube roots

Workbook answers

Exercise 26.1 (page 76)

1 a Between 4 and 5 (could also be negative)
b Between 7 and 8 (could also be negative)
c Between 11 and 12 (could also be negative)

2 a 0.6 and −0.6 b 0.1 and −0.1 c 1.1 and −1.1

3 a 10 b 15

4 5 cm

Exercise 26.2 (page 76)

1 a 3 b 4 c −2

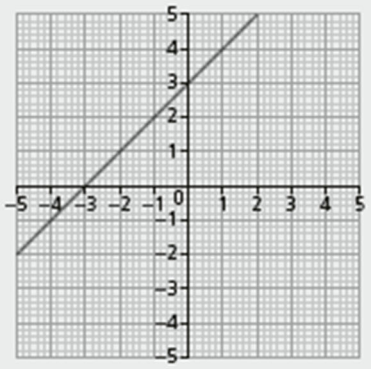
2 a 512 b 36

27 Graphs and equations of straight lines

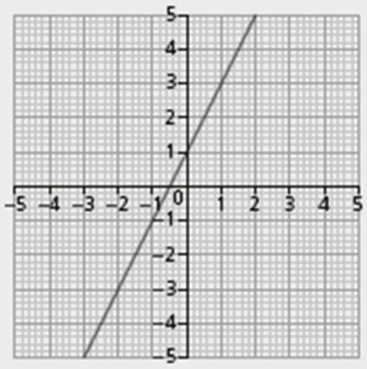
Workbook answers

Exercise 27.1 (page 77)

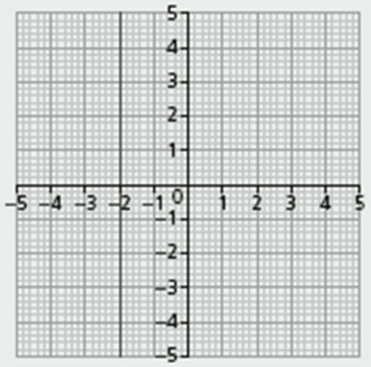
1 a



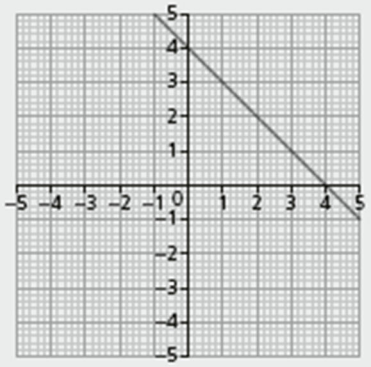
b



c



2 a



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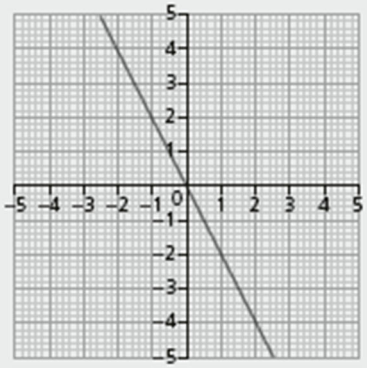
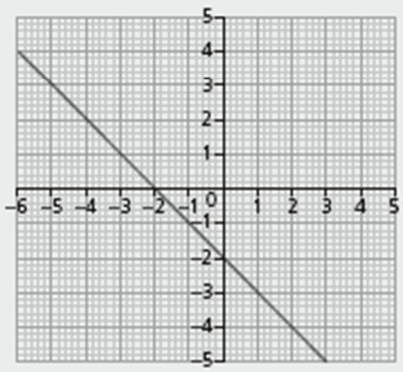
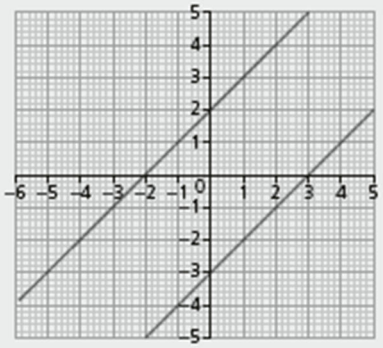


c



3 Two straight lines will only cross at a maximum of 1 point. If they cross more than once, at least one of the lines must be curved.
4 Students plot the lines to show they are parallel. Parallel lines will never meet.



Exercise 27.2 (page 79)

1 $y = 3x$
2 $y = 2x + 1$
3 a $y =$ any number
b Any line in the form $y = mx + c$
c $x =$ any number

Exercise 27.3 (page 80)

1 a $y = 2x \pm a$ b $y = ax + 1$ (a can be any number)
2 A: $y = -x + 2$ B: $y = 3x + 2$ C: $y = 2x$ D: $x = 4$
E: $y = x + 1$ F: $y = x$ G: $y = -2$
3 a $C = 10d + 45$ b 3 days

28 Distances and bearings

Workbook answers

Exercise 28.1 (page 83)

1 a 192 km
b 937.5 miles
c 55 miles
2 32 km or 20 miles

Exercise 28.2 (page 83)

Students' bearings may differ from these by ±2°.
1 a 120°
b 045°
c 225°
2 a 032°
b 115°
c 160°
d 295°
3 a 280 km
b She has measured the bearing anticlockwise rather than clockwise.
c Bearing 130°; Distance 240 km

29 Ratio

Workbook answers

Exercises 29.1–29.2 (page 86)

1 a Yes, $1 \times 4 = 4$, $5 \times 4 = 20$
b No, $7 \times 2 = 14$ but $8 \times 2 \neq 15$
c Yes, $3 \times 9 = 27$, $5 \times 9 = 45$
2 a 3:5 b 5:11
3 a 5:2 b 3:10
4 First drink is more concentrated.
An equivalent fraction to 1:10 is 2:20 compared to the second drink which is 2:25. More water for 2 parts of cordial in the second drink.

Exercise 29.3–29.4 (page 86)

1 a 120 and 200
b 96 and 224
2 a $\frac{2}{7}$
b 20
3 a 108°
b Angles in a quadrilateral sum to 360°.
4 a 2:1
b 18:5

Exercise 29.5 (page 88)

1 $6.08
2 112.5 miles
3 5 hours

30 Reading and interpreting graphs

Workbook answers

Exercise 30.1 (page 89)

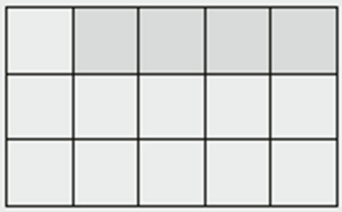
1 a Horse A: it reaches 3 miles in less time than horse B.
b 40 seconds
c 4 minutes and 40 seconds, the line became steeper.
2 a 60 m
b 6 seconds
c i True: ball A is in the air for 6 seconds, ball B for 7 seconds.
ii True: ball B was fired 2 seconds after ball A.
iii False: ball B went 20m higher than ball A.

Exercise 30.2 (page 91)

1 a Sharifa gets into the bath.
b 9 minutes: water level suddenly goes down at 18 minutes.
2 a Oven A reaches 100°C after 5 minutes compared to oven B which reaches 100°C after about 12 minutes.
b 18–19°C. They are at room temperature.
c B
d 18 minutes: the lines cross at this point.

Section 3 – Review

1 a



b Add 2

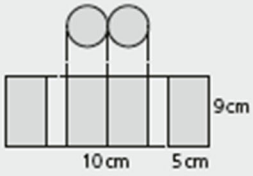
c $2n+3$

d 43

2 a −21°C

b −27°C

3 Scale drawing as follows:



4 a $y=\frac{x+2}{5}$

b $y=\frac{x}{4}-3$

5 To prove ABCD is a parallelogram, midpoints of diagonals cross at the same point.

Midpoint AC $=\left(4, 2\frac{1}{2}\right)$

Midpoint BD $=\left(4, 2\frac{1}{2}\right)$

Therefore, a parallelogram.

6 Student's method showing $\sqrt{0.49}=0.7$

7 $(9,-1)$ and $(-12,-8)$

8 a Student's drawing of A and B. (Accept $\pm1^{\circ}$ and ±1mm error).

b 238° (Accept $\pm2^{\circ}$)

9 Student's use of three colours. Number of squares coloured 8 : 16 : 40

10 a Graph 1 is tariff B. Graph 2 is tariff A. Student's explanation. *y*-intercepts are 40 and 20, respectively.

b Tariff B because for a value of 60, the graph for tariff B is below that for tariff A, implying it is cheaper.

c Either, because that is approximately where the graphs intersect.