

KS3 Mathematics Homework



Pack E: Level 7

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1 Multiplication and division by numbers less than one

- | | | | |
|----|---------------------|---------|--------------------------|
| 1 | 28×0.1 | 1..... | ☐ |
| 2 | 3×0.01 | 2..... | ☐ |
| 3 | $0.6 \div 0.1$ | 3..... | ☐ |
| 4 | $0.5 \div 0.001$ | 4..... | ☐ |
| 5 | 6.8×0.001 | 5..... | ☐ |
| 6 | $7 \div 0.01$ | 6..... | ☐ |
| 7 | 5.7×0.1 | 7..... | ☐ |
| 8 | 0.03×0.001 | 8..... | ☐ |
| 9 | $4.2 \div 0.01$ | 9..... | ☐ |
| 10 | $0.8 \div 0.001$ | 10..... | ☐ |
| 11 | $73 \div 0.1$ | 11..... | ☐ |
| 12 | 382×0.01 | 12..... | ☐ |
| 13 | $42 \div 0.1$ | 13..... | ☐ |
| 14 | 23.6×0.001 | 14..... | ☐ |
| 15 | 6.8×0.01 | 15..... | ☐ |
| 16 | 2.37×0.1 | 16..... | ☐ |
| 17 | $0.86 \div 0.001$ | 17..... | ☐ |
| 18 | 0.6×0.001 | 18..... | ☐ |
| 19 | $32 \div 0.01$ | 19..... | ☐ |
| 20 | $17 \div 0.1$ | 20..... | ☐ |

Minimum mark

Circle grade

16	13	10	7	
A	B	C	D	E

20



2 Mental arithmetic shortcuts – 1

- | | | | |
|----|---------------------|---------|--------------------------|
| 1 | 36×10 | 1..... | ☐ |
| 2 | $21 \div 100$ | 2..... | ☐ |
| 3 | 28×1000 | 3..... | ☐ |
| 4 | $6 \div 10$ | 4..... | ☐ |
| 5 | 4.7×100 | 5..... | ☐ |
| 6 | $38.4 \div 1000$ | 6..... | ☐ |
| 7 | 0.03×10 | 7..... | ☐ |
| 8 | $230 \div 100$ | 8..... | ☐ |
| 9 | $4.62 \div 10$ | 9..... | ☐ |
| 10 | 0.68×1000 | 10..... | ☐ |
| 11 | 300×60 | 11..... | ☐ |
| 12 | $12\ 000 \div 300$ | 12..... | ☐ |
| 13 | $540 \div 60$ | 13..... | ☐ |
| 14 | 4000×200 | 14..... | ☐ |
| 15 | 60×80 | 15..... | ☐ |
| 16 | 400×3000 | 16..... | ☐ |
| 17 | $36\ 000 \div 400$ | 17..... | ☐ |
| 18 | 20×80 | 18..... | ☐ |
| 19 | $28\ 000 \div 7000$ | 19..... | ☐ |
| 20 | $480\ 000 \div 800$ | 20..... | ☐ |

Minimum mark

Circle grade

16	13	10	7	
A	B	C	D	E

20



3 Mental arithmetic shortcuts – 2

- | | | | |
|----|--------------------|---------|--------------------------|
| 1 | 6.2×10 | 1..... | ☐ |
| 2 | $5.3 \div 100$ | 2..... | ☐ |
| 3 | 74×1000 | 3..... | ☐ |
| 4 | $36 \div 10$ | 4..... | ☐ |
| 5 | 82×100 | 5..... | ☐ |
| 6 | $5.82 \div 1000$ | 6..... | ☐ |
| 7 | 7.36×1000 | 7..... | ☐ |
| 8 | 27.43×10 | 8..... | ☐ |
| 9 | $38.7 \div 100$ | 9..... | ☐ |
| 10 | $0.32 \div 10$ | 10..... | ☐ |
| 11 | $270 \div 1000$ | 11..... | ☐ |
| 12 | 6.804×100 | 12..... | ☐ |
| 13 | 0.52×1000 | 13..... | ☐ |
| 14 | $0.73 \div 10$ | 14..... | ☐ |
| 15 | 6.28×10 | 15..... | ☐ |
| 16 | $0.71 \div 100$ | 16..... | ☐ |
| 17 | $36.21 \div 1000$ | 17..... | ☐ |
| 18 | 281×10 | 18..... | ☐ |
| 19 | $3.27 \div 10$ | 19..... | ☐ |
| 20 | 5.28×1000 | 20..... | ☐ |

Minimum mark

Circle grade

16	13	10	7	
A	B	C	D	E

20



4 Rounding numbers

- 1 Write 328 correct to one significant figure. 1..... ☐
- 2 Write 687 correct to two significant figures. 2..... ☐
- 3 Write 3078 correct to three significant figures. 3..... ☐
- 4 Write 273 correct to one significant figure. 4..... ☐
- 5 Write 73.02 correct to three significant figures. 5..... ☐
- 6 Write 62.83 correct to two significant figures. 6..... ☐
- 7 Write 25.72 correct to one decimal place. 7..... ☐
- 8 Write 3.617 correct to two decimal places. 8..... ☐
- 9 Write 0.07131 correct to three decimal places. 9..... ☐
- 10 Write 0.0728 correct to two significant figures. 10..... ☐
- 11 Write 6.816 correct to one decimal place. 11..... ☐
- 12 Write 0.07291 correct to three decimal places. 12..... ☐
- 13 Write 7729 correct to one significant figure. 13..... ☐
- 14 Write 6008 correct to three significant figures. 14..... ☐
- 15 Write 2.091 correct to one decimal place. 15..... ☐
- 16 Write 307.82 correct to two significant figures. 16..... ☐
- 17 Write 0.03271 correct to three decimal places. 17..... ☐
- 18 Write 5.009 correct to one decimal place. 18..... ☐
- 19 Write 7.327 correct to two significant figures. 19..... ☐
- 20 Write 3.997 correct to two decimal places. 20..... ☐

Minimum mark

Circle grade

16	13	10	7	
A	B	C	D	E

20



5 Estimating

Estimate the answers to the following questions by rounding each number to one significant figure.

- | | | | |
|----|---|------------|--------------------------|
| 1 | 2936×7948 | 1..... | ☐ |
| 2 | $8109 \div 39$ | 2..... | ☐ |
| 3 | 6018×2.938 | 3..... | ☐ |
| 4 | $39\,817 \div 489$ | 4..... | ☐ |
| 5 | $7982 + 1034 + 5897 + 8987$ | 5..... | ☐ |
| 6 | $60\,725 - 39\,811$ | 6..... | ☐ |
| 7 | 6981×0.19 | 7..... | ☐ |
| 8 | $801.3 \div 0.793$ | 8..... | ☐ |
| 9 | 69.7×0.0712 | 9..... | ☐ |
| 10 | $6.017 \div 0.0310$ | 10..... | ☐ |
| 11 | $79.31 \div 0.413$ | 11..... | ☐ |
| 12 | 0.0701×3.079 | 12..... | ☐ |
| 13 | 3.98×0.0912 | 13..... | ☐ |
| 14 | $0.613 \div 0.0298$ | 14..... | ☐ |
| 15 | 0.3017×0.0693 | 15..... | ☐ |
| 16 | $0.00812 \div 0.0998$ | 16..... | ☐ |
| 17 | 3989 litres of water flow over a waterfall each second. Estimate how long 20 801 litres will take to flow over the waterfall. | 17..... | ☐ |
| 18 | A greengrocer sold 618.2 kg of potatoes at 29p per kilogram. Estimate the total value of the sale. | 18 £ | ☐ |
| 19 | A lorry can carry 49 tonnes in one load. Estimate how many loads will be required to transport 20 312 tonnes of bricks. | 19..... | ☐ |
| 20 | A glass holds 0.2918 l. Estimate how many glasses can be filled from a tank containing 89.32 l. | 20..... | ☐ |

Minimum mark
Circle grade

16	13	10	7	
A	B	C	D	E

20

6 Using a calculator (brackets and memory) – 1

Give your answers correct to six significant figures where appropriate. Show your calculator keys for questions 1 and 5.

1 $2.6 (5.83 - 1.9)$

1..... ☐

2 $7.38 (5.12 + 6.872)$

2..... ☐

3 $(4.98 - 3.26) - (3.87 \times 6.34)$

3..... ☐

4 $(8.75 - 11.7) 28.3$

4..... ☐

5
$$\frac{47.28 \times 3.681}{8.917 \times 4.362}$$

5..... ☐

6
$$\frac{43.987 - 3.798}{6.371 - 1.987}$$

6..... ☐

7
$$\frac{4.8 (3.75 - 8.62)}{(2.7 \times 3.85) - 1.63}$$

7..... ☐

8
$$\frac{42.8 \times 36.5}{28.37 \times 2.987}$$

8..... ☐

The make and type of my calculator is:

Minimum mark

Circle grade

7	5	4	2	
A	B	C	D	E

8

7 Using a calculator (using the memory) – 2

Find the value of y by using the memory. Give your answers correct to six significant figures.

$x = 1.31264$ in all of the questions.

1 $y = x^3 + x^2 + x$ 1.....

2 $y = x^5 - x^4 + x^3$ 2.....

3 $y = 6x^8 - 3x^5 + 2x^4$ 3.....

4 $y = 8x^9 - 7x^5 + 6x^3$ 4.....

5 $y = 3x^4 - 2x^3 - 7x^2 + 8x$ 5.....

6 $y = 12x^3 - 4x^2 + 6x - 8$ 6.....

7 $y = 27x^3 - 32x^2 - 18$ 7.....

8 $y = 2x^8 - 3x^6 + 4x^5$ 8.....

9 $y = 7x^6 - 3x^5 - 4x^2 - 6$ 9.....

10 $y = 3x^5 - 2x^4 - 3x + 7$ 10.....

11 $y = -6x^8 - 4x^5 - 3x^4$ 11.....

12 $y = -4x^7 - 3x^5 - 2x$ 12.....

Minimum mark
Circle grade

10	8	6	4	
A	B	C	D	E

12

8 Solving problems

- 1 An empty tank is filled with water at the rate of 200 cc per second. The dimensions of the tank are 2 m by 3 m by 4 m. What fraction of the tank is filled after two hours? Give your answer in its lowest terms.

1.....

- 2 A small packet of soap powder costs 33p and contains 750 g. A large packet of soap powder costs £1.68 and contains 5 kg. Mrs Wright needs to buy 225 kilograms for her laundry business. How much money will she save by buying the large packets instead of the small packets of soap powder?

2.....

- 3 The selling price of a car comprises the cost of material, the cost of production and the profit. The ratio of cost of production to the cost of material is 5:7. A car was sold for £17 700. 30% of the selling price was profit. What was the cost of the material used in the car?

3.....

- 4 Jason had a cough. He bought a 0.2 litre bottle of cough medicine for £2.40. The label on the bottle stated 'Take a 5 ml spoonful of medicine three times each day'. Jason took the medicine for seven days. What was the value of the medicine left in the bottle?

4.....

Minimum mark
Circle grade

4	3	2	1	
A	B	C	D	E

4

9 Fractions and percentages

- 1 Find $\frac{5}{6}$ of 42 1..... ☐
- 2 Find $\frac{3}{8}$ of 96 2..... ☐
- 3 Increase 28 by $\frac{5}{16}$ 3..... ☐
- 4 Increase 62 by $\frac{3}{10}$ 4..... ☐
- 5 Decrease 75 by $\frac{5}{8}$ 5..... ☐
- 6 Decrease 60 by $\frac{2}{5}$ 6..... ☐
- 7 Find 24% of 70 7..... ☐
- 8 Find 32% of 36 8..... ☐
- 9 Increase 80 by 20% 9..... ☐
- 10 Increase 250 by 36% 10..... ☐
- 11 Decrease 300 by 18% 11..... ☐
- 12 Decrease 80 by 72% 12..... ☐
- 13 A meal costs £28 plus 17.5% VAT.
What is the total cost? 13..... ☐
- 14 840 pupils attended a school in 1998.
In 1999 numbers increased by $\frac{1}{8}$.
How many pupils attended in 1999? 14..... ☐
- 15 A class had 25 pupils. 16% of the pupils owned
a computer. How many pupils owned a computer? 15..... ☐
- 16 A bus journey normally takes 35 minutes.
Road works increased the time by $\frac{2}{5}$.
How long did the journey take? 16..... ☐

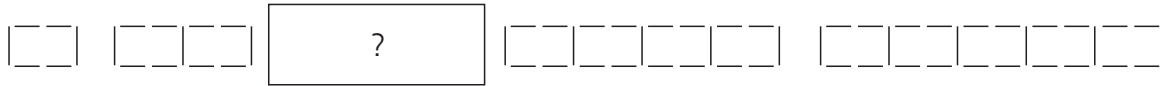
Minimum mark
Circle grade

13	11	8	5	
A	B	C	D	E

16

10 Number patterns – 1

1 Here is a pattern made out of matchsticks:



- a Draw the missing matchsticks in the pattern. 1a ☐
- b What is the rule to find the n th term?
(Give your answer using algebra.) 1b ☐
- c Use your rule to find the number of matchsticks in:
- i the 8th term. 1ci ☐
- ii the 64th term. 1cii ☐

2 Here is a pattern: 7, 10, 13, 16, 19

- a What is the next number in the pattern? 2a ☐
- b What is the rule to find the n th term?
(Give your answer using algebra.) 2b ☐
- c Use your rule to find:
- i the 20th term. 2ci ☐
- ii the 40th term. 2cii ☐

3 Here is a pattern: 10, 2, -6, -14, -22

- a What is the next number in the pattern? 3a ☐
- b What is the rule to find the n th term?
(Give your answer using algebra.) 3b ☐
- c Use your rule to find:
- i the 38th term. 3ci ☐
- ii the 70th term. 3cii ☐

Minimum mark	10	8	6	4	
Circle grade	A	B	C	D	E

12

11 Number patterns – 2

For questions 1 to 3:

- a Give the next number in each pattern.
b Give the special names of these patterns.

1 1, 4, 9, 16, 25, 36

1a ☐

1b..... ☐

2 1, 3, 6, 10, 15, 21

2a ☐

2b..... ☐

3 1, 8, 27, 64, 125, 216

3a ☐

3b..... ☐

4 Give the next number in each pattern:

a 1, 1, 2, 3, 5, 8, 13, 21

4a ☐

b $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}$

4b..... ☐

For questions 5 to 7:

- a Give the next number in each pattern.
b What is the rule to find the nth term?
c What is the 20th term?
d What is the 40th term?

5 3, 12, 27, 64, 75, 108

5a ☐

5b..... ☐

5c..... ☐

5d ☐

6 2, 6, 12, 20, 30, 42

6a ☐

6b..... ☐

6c..... ☐

6d ☐

7 4, 12, 24, 40, 60, 84

7a ☐

7b..... ☐

7c..... ☐

7d ☐

Minimum mark

Circle grade

16	13	10	7	
A	B	C	D	E

20

12 Simultaneous equations

1 $2x + 3y = 21$
 $3x + 4y = 29$

1 $x = \dots\dots\dots$

$y = \dots\dots\dots$

2 $2x + 5y = 24$
 $5x - 7y = -18$

2 $x = \dots\dots\dots$

$y = \dots\dots\dots$

3 $6a - 5c = -7$
 $2a + 4c = 26$

3 $x = \dots\dots\dots$

$y = \dots\dots\dots$

4 $2a - 3c = -13$
 $3a - 5c = -22$

4 $x = \dots\dots\dots$

$y = \dots\dots\dots$

5 $6a - 5c = 28$
 $3a - c = 11$

5 $x = \dots\dots\dots$

$y = \dots\dots\dots$

6 $2x + 3y = -13$
 $3x - 5y = 9$

6 $x = \dots\dots\dots$

$y = \dots\dots\dots$

7 $3x - y = -13$
 $2x + 3y = -5$

7 $x = \dots\dots\dots$

$y = \dots\dots\dots$

8 $3x = 13 - 2y$
 $5y = 3x + 1$

8 $x = \dots\dots\dots$

$y = \dots\dots\dots$

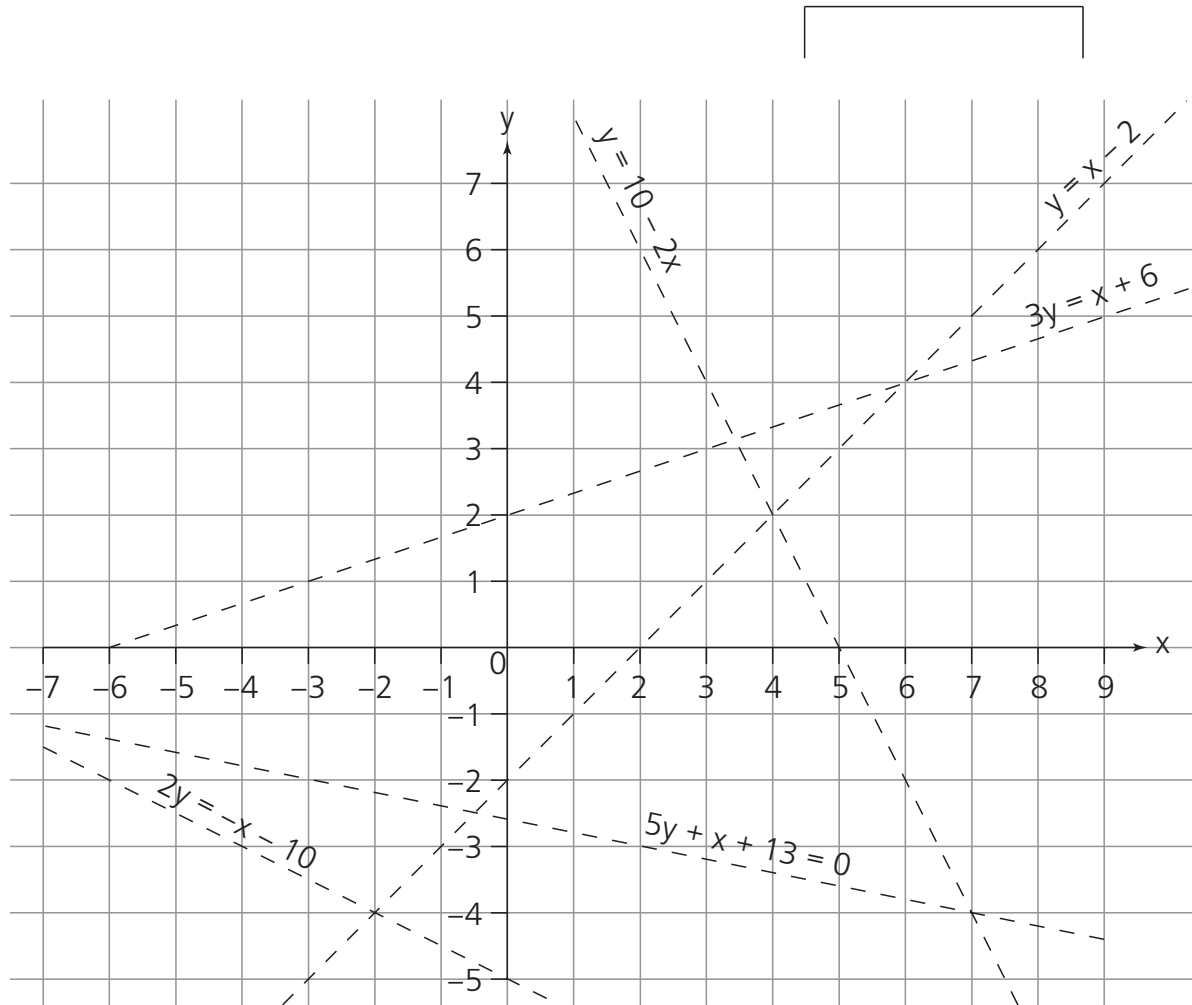
Minimum mark

Circle grade

13	11	8	5	
A	B	C	D	E

16

13 Solving simultaneous equations by drawing graphs



Solve the following simultaneous equations by using the graph above:

1 $3y = x + 6$ and $y = x - 2$

1 $x = \dots\dots\dots$

$y = \dots\dots\dots$

2 $2y = -x - 10$ and $y = x - 2$

2 $x = \dots\dots\dots$

$y = \dots\dots\dots$

3 $5y + x + 13 = 0$ and $y = 10 - 2x$

3 $x = \dots\dots\dots$

$y = \dots\dots\dots$

4 $y = x - 2$ and $y = 10 - 2x$

4 $x = \dots\dots\dots$

$y = \dots\dots\dots$

Minimum mark

Circle grade

7	5	4	2	
A	B	C	D	E

14 Inequalities – 1

Solve these inequalities:

- | | | | |
|----|------------------|---------|--------------------------|
| 1 | $5x > 30$ | 1..... | ☐ |
| 2 | $6x \leq 18$ | 2..... | ☐ |
| 3 | $4x + 2 \geq 10$ | 3..... | ☐ |
| 4 | $5x - 3 < 18$ | 4..... | ☐ |
| 5 | $3a - 4 > 20$ | 5..... | ☐ |
| 6 | $2y \leq 7$ | 6..... | ☐ |
| 7 | $x^2 < 36$ | 7..... | ☐ |
| 8 | $y^2 < 49$ | 8..... | ☐ |
| 9 | $2a^2 < 200$ | 9..... | ☐ |
| 10 | $a^2 > 25$ | 10..... | ☐ |
| 11 | $-2a \leq -24$ | 11..... | ☐ |
| 12 | $-5a > 8$ | 12..... | ☐ |
| 13 | $3a < -30$ | 13..... | ☐ |
| 14 | $-6a \geq 15$ | 14..... | ☐ |
| 15 | $-5x < -15$ | 15..... | ☐ |
| 16 | $-8a - 3 > 9$ | 16..... | ☐ |

Minimum mark

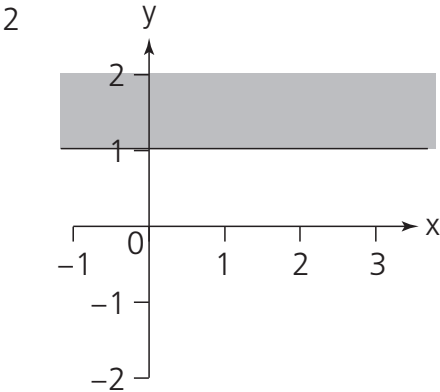
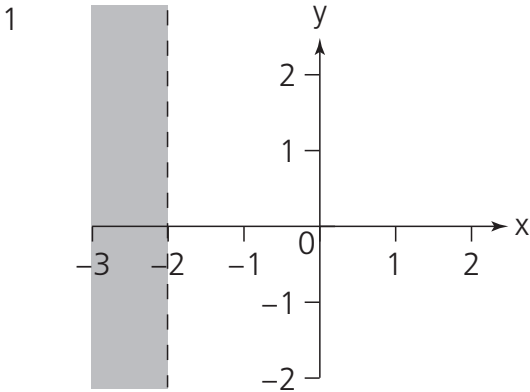
Circle grade

13	11	8	5	
A	B	C	D	E

16

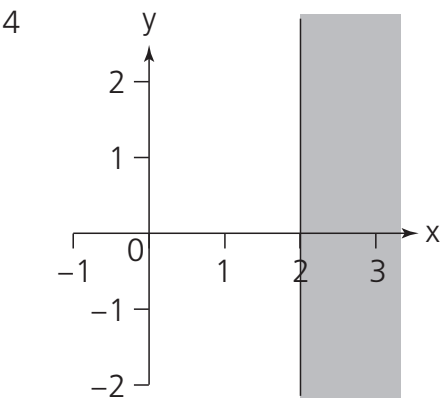
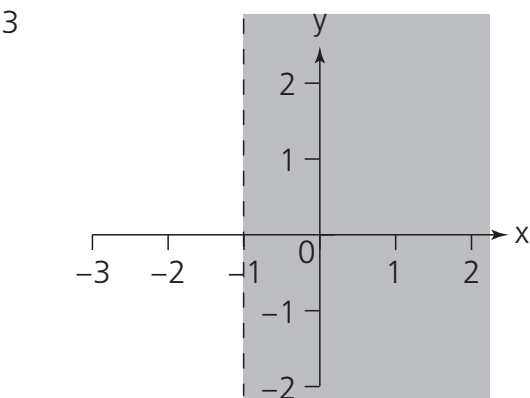
15 Inequalities – 2

Describe the shaded regions:



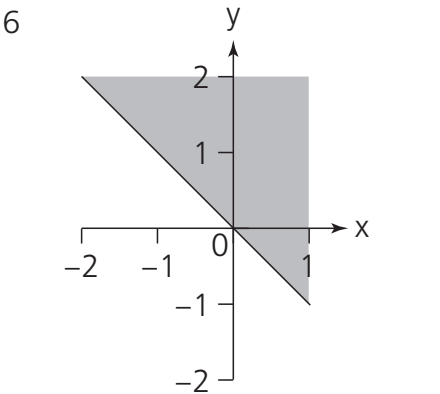
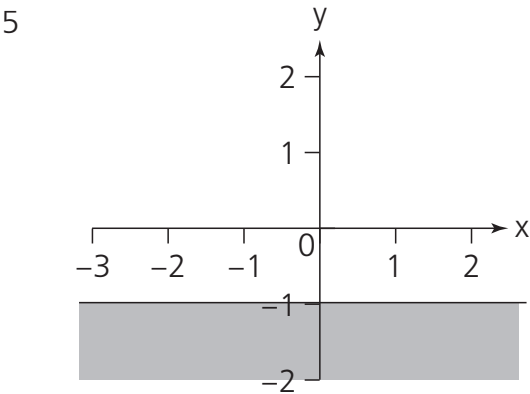
1..... ☐

2..... ☐



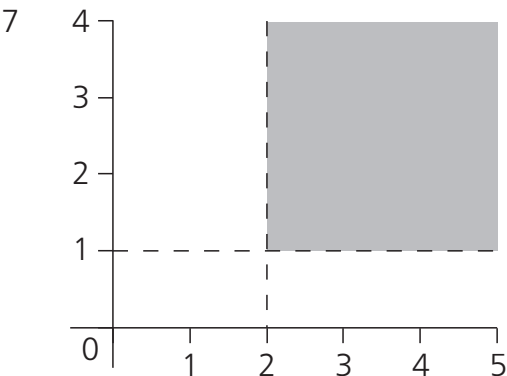
3..... ☐

4..... ☐



5..... ☐

6..... ☐



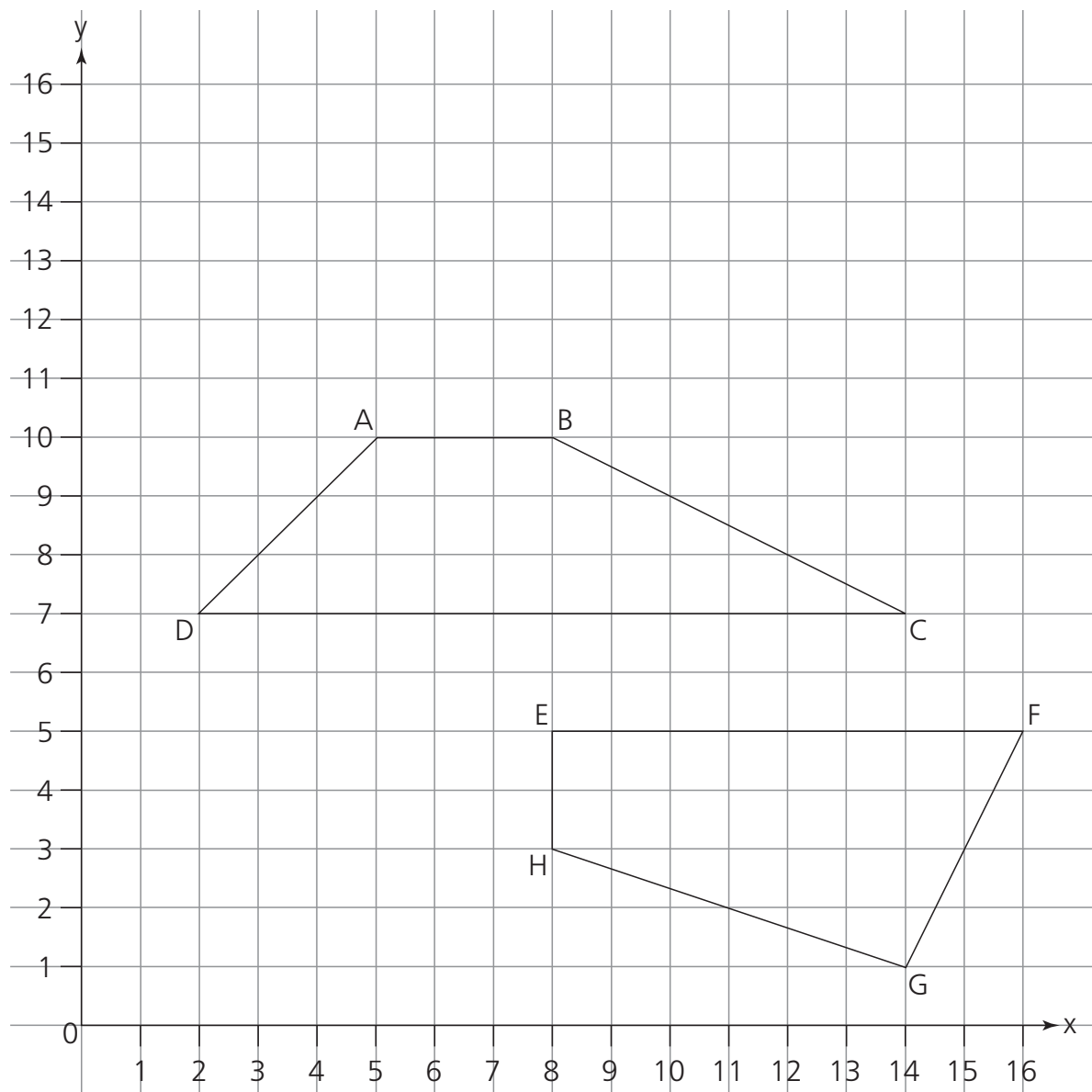
7 x..... ☐

y..... ☐

Minimum mark
Circle grade

7	5	4	2	
A	B	C	D	E

16 Enlargement by a fractional scale factor



- 1 Enlarge the trapezium ABCD by a scale factor of $\frac{1}{3}$.

Centre of enlargement is the point (2, 16).

Label the new trapezium A'B'C'D'.

1A' = ☐

1B' = ☐

1C' = ☐

1D' = ☐

- 2 Enlarge the quadrilateral EFGH by a scale factor of $\frac{1}{2}$.

Centre of enlargement is the point (16, 15).

Label the new quadrilateral E'F'G'H'.

2E' = ☐

2F' = ☐

2G' = ☐

2H' = ☐

Minimum mark

Circle grade

7	5	4	2	
A	B	C	D	E

17 Accuracy of measurement

The following questions give a measurement. In each question give:
a The maximum possible value and b The minimum possible value.

- | | | | |
|----|--|-------------|----------------------|
| 1 | A book, mass 1.7 kg | 1a.....kg | <input type="text"/> |
| | | 1b.....kg | <input type="text"/> |
| 2 | A room, length 8.32 m | 2am | <input type="text"/> |
| | | 2b.....m | <input type="text"/> |
| 3 | A bus, mass 17.6 t | 3at | <input type="text"/> |
| | | 3bt | <input type="text"/> |
| 4 | A tea cup, capacity 173 ml | 4aml | <input type="text"/> |
| | | 4b.....ml | <input type="text"/> |
| 5 | A barrel, capacity 48.3 l | 5al | <input type="text"/> |
| | | 5b.....l | <input type="text"/> |
| 6 | A building, height 27.384 m | 6am | <input type="text"/> |
| | | 6b.....m | <input type="text"/> |
| 7 | John took 12.83 seconds to run a race | 7a.....sec | <input type="text"/> |
| | | 7b.....sec | <input type="text"/> |
| 8 | An advert lasted 23.64 seconds | 8a.....sec | <input type="text"/> |
| | | 8b.....sec | <input type="text"/> |
| 9 | A packet of tea, mass 127.8 g | 9ag | <input type="text"/> |
| | | 9bg | <input type="text"/> |
| 10 | A car, length 4.20 m | 10am | <input type="text"/> |
| | | 10b.....m | <input type="text"/> |
| 11 | A boy's height was 160 centimetres,
accurate to the nearest centimetre. | 11acm | <input type="text"/> |
| | | 11bcm | <input type="text"/> |
| 12 | A can of cola had a capacity of 35 cl
correct to the nearest 5 cl. | 12acl | <input type="text"/> |
| | | 12bcl | <input type="text"/> |

Minimum mark
Circle grade

19	16	12	8	
A	B	C	D	E

24

18 Compound units

- 1 A car travels 627 kilometres in 8 hours and 17 minutes. Calculate the average speed correct to three significant figures. 1.....km/h ☐
- 2 A train travels for 1 hour 23 minutes at an average speed of 73 km/h. Calculate the distance travelled correct to three significant figures. 2km ☐
- 3 A man ran 27 kilometres at an average speed of 14.7 km/h. How long did the journey take? Give the answer to the nearest second. 3 .h.....m.....s..... ☐
- 4 A cyclist travels 47 kilometres in 2 hours 26 minutes. Calculate the distance travelled correct to three significant figures. 4.....km/h ☐
- 5 A plane travels for 47 minutes at an average speed of 236 km/h. Calculate the distance travelled correct to three significant figures. 5km ☐
- 6 A train travelled 323 kilometres at an average speed of 91 km/h. Calculate the time taken correct to the nearest second. 6 .h.....m.....s..... ☐
- 7 A block of wood, volume 238 cm³, has a mass of 184 g. Calculate the density. Give your answer correct to three significant figures. 7g/m³ ☐
- 8 A horse runs at a speed of 11.2 m/s. What is this speed in kilometres per hour? 8.....km/h ☐

Minimum mark
Circle grade

7	5	4	2	
A	B	C	D	E

8

19 Calculating length, area and volume – 1

Find: a The area, b The perimeter of:

1 A square side 8 cm

1a

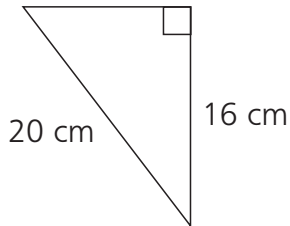
1b.....

2 A rectangle length 10 cm, width 7 cm

2a

2b.....

3 12 cm

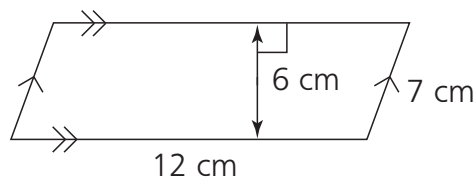


3a

3b.....

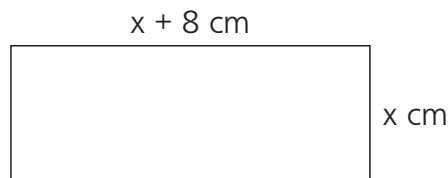
4 Find the area of the parallelogram

4.....



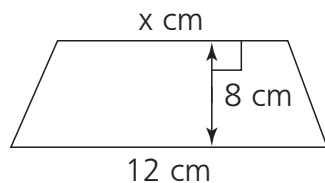
5 The perimeter of this rectangle is 36 cm.
What is the area of the rectangle?

5.....



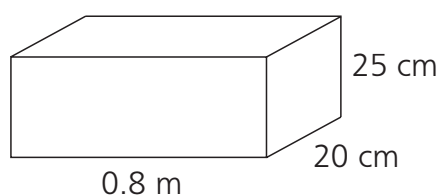
6 The area of this trapezium is 76 cm². Find x.

6.....



7 What is the volume of this cuboid?

7.....



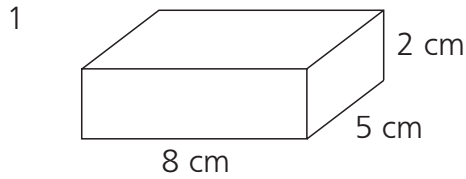
Minimum mark

Circle grade

8	6	5	3	
A	B	C	D	E

10

20 Calculating length, area and volume – 2



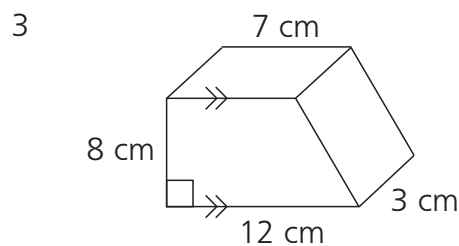
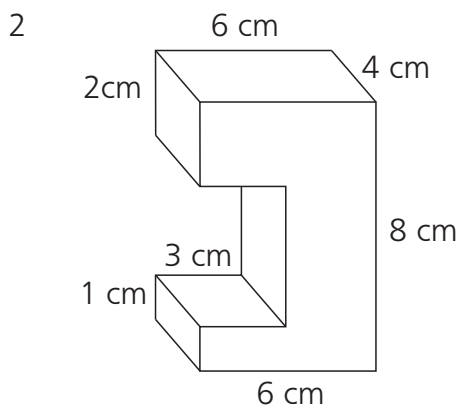
a What is the volume?

1a ☐

b What is the total surface area?

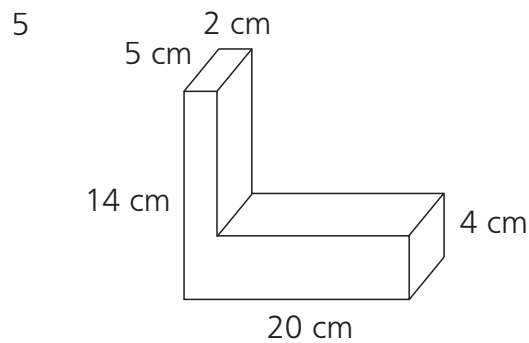
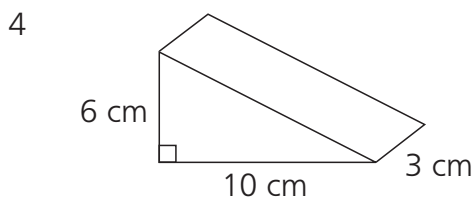
1b..... ☐

Find the volume of these prisms:



2..... ☐

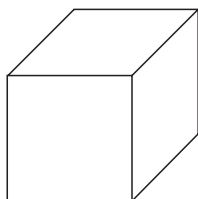
3..... ☐



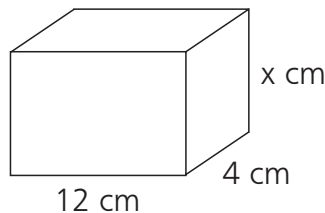
4..... ☐

5..... ☐

6 The volume of this cube is 343 cm^3 . Find the total surface area.



7 The volume of this cuboid is 336 cm^3 . What is the value of x ?



6..... ☐

7..... ☐

Minimum mark

Circle grade

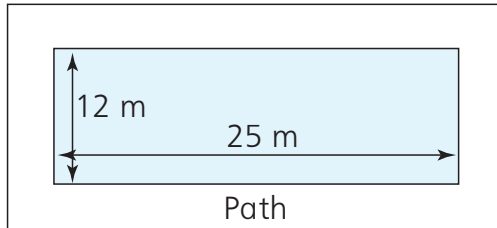
7	5	4	2	
A	B	C	D	E

8

21 Calculating length, area and volume – 3

You must write down the units in your answer, eg 8 cm³, 4 m².

- 1 This is a diagram of a swimming pool with a concrete path 2 m wide all the way around.

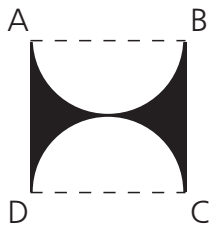


- a Find the area of the path.
b The path is made of concrete 8 cm deep.
Find the volume of concrete.

1a ☐

1b..... ☐

- 2 ABCD is a square piece of card, side 5 cm. Two semi-circles, diameter 5 cm are cut out.

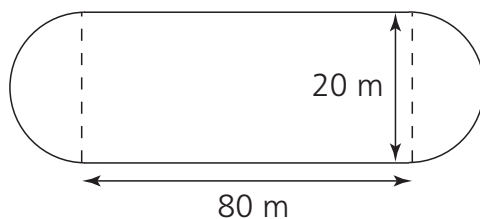


- a What is the shaded area?
b What is the perimeter of the shaded shape?

2a ☐

2b..... ☐

- 3 This is a diagram of a running track.
Both ends are semi-circles.

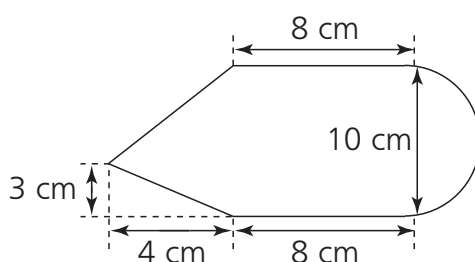


Calculate the length of the running track.

3..... ☐

- 4 Calculate the area of this shape:

4..... ☐



Minimum mark
Circle grade

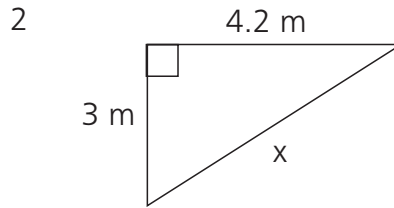
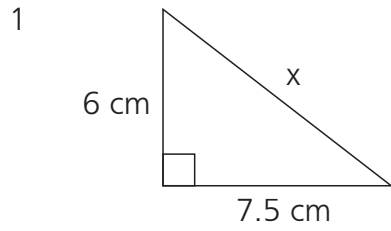
5	4	3	2	
A	B	C	D	E

6

22 Pythagoras' theorem – 1

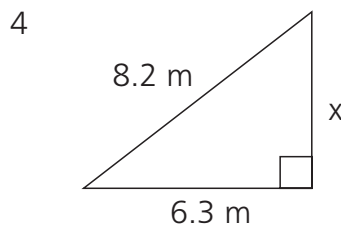
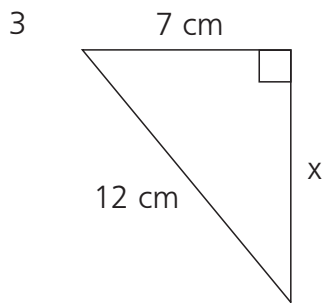
Find the length of the sides indicated.

Give your answers correct to three significant figures.



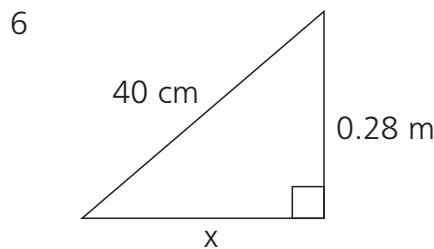
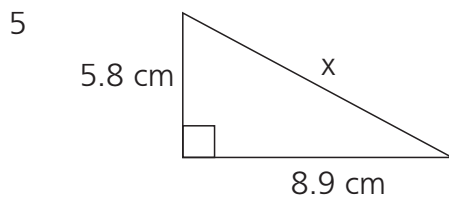
1cm

2m



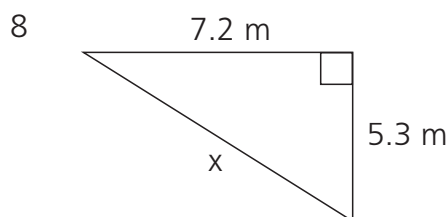
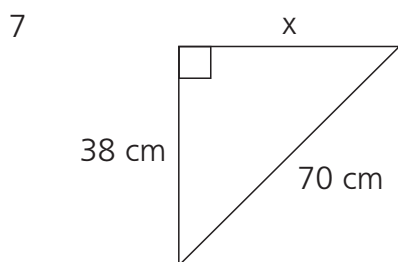
3cm

4m



5cm

6cm



7cm

8m

Minimum mark

Circle grade

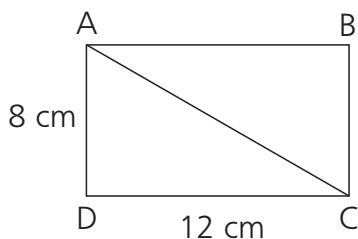
7	5	4	2	
A	B	C	D	E

8

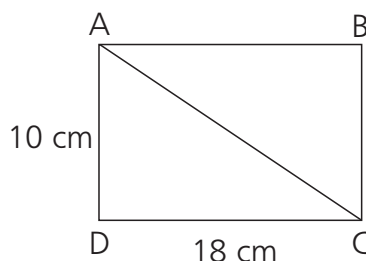
23 Pythagoras' theorem – 2

Give answers correct to three significant figures where appropriate.

- 1 ABCD is a rectangle.
Calculate the length
of the diagonal AC.



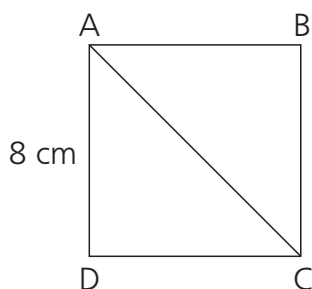
- 2 ABCD is a rectangle.
Calculate the length from
B to the mid-point of AC.



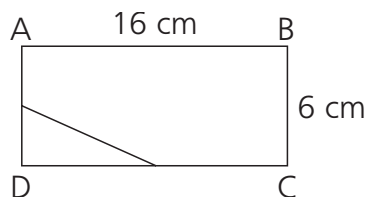
1cm

2cm

- 3 This is a square, side
8 cm. Calculate the length
of the diagonal AC.



- 4 ABCD is a rectangle. Calculate
the length of the line joining
the mid-point of AD to the
mid-point of CD.



3cm

4cm

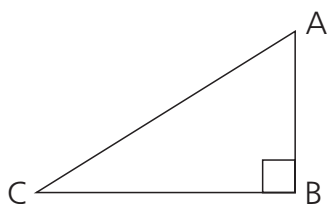
- 5 A ship sails 80 km west, then 100 km south.
How far is the ship from its starting point?

5km

- 6 A plane flies 200 km north. It then flies west.
The plane is 250 km from its starting point.
How far west did the plane fly?

6km

- 7 The sides AB and BC are in the ratio 1:2.
AC is 10 m. Calculate the length AB.



7m

- 8 A square has a diagonal length of 10 cm.
Calculate the area of the square.

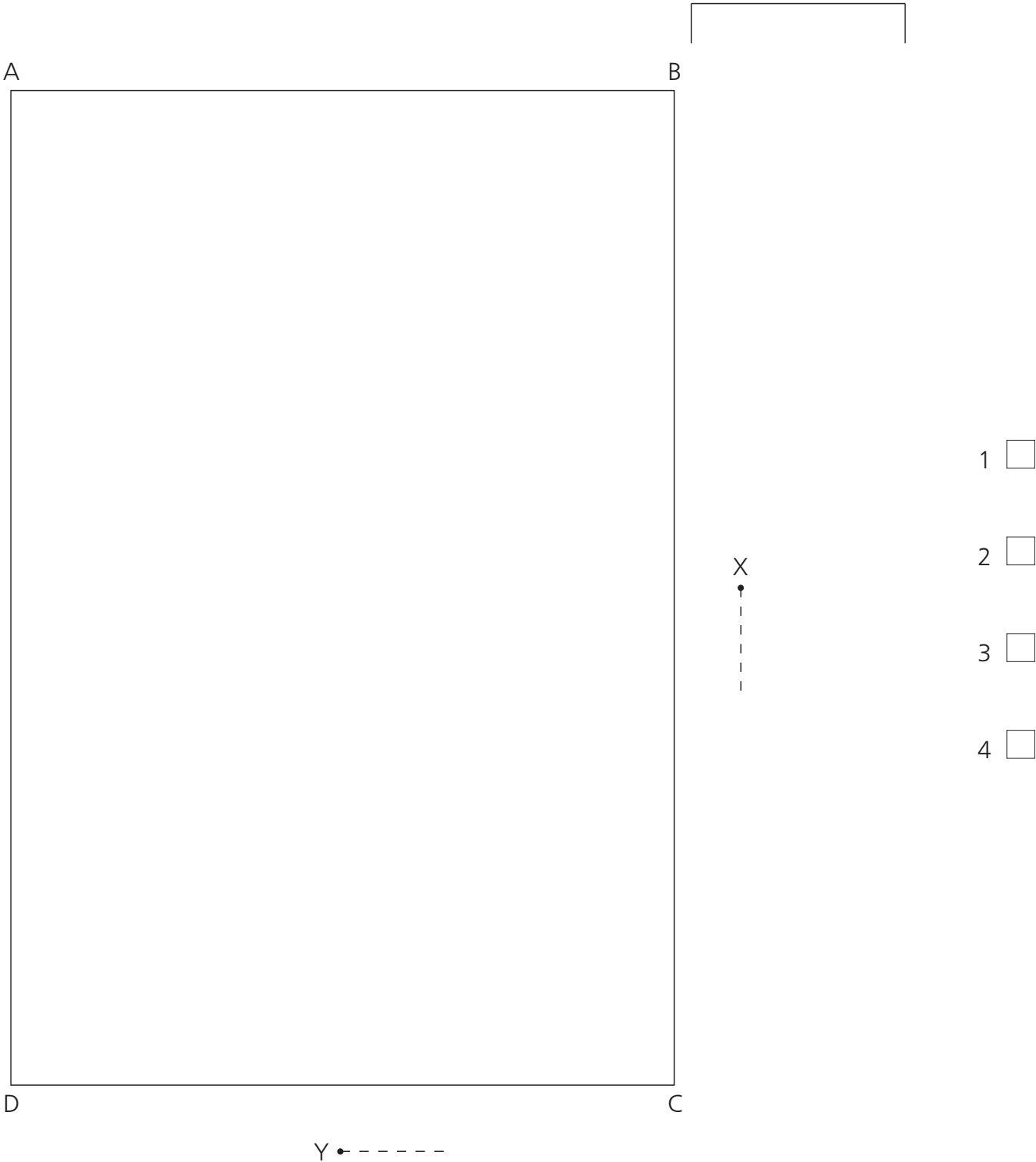
8cm

Minimum mark
Circle grade

7	5	4	2	
A	B	C	D	E

8

24 Locus



There are two footpaths across this field. (Scale 1 cm represents 10 m.)

- The first footpath is always an equal distance from B and C. Draw a dotted line to show the footpath.
- The second footpath is always an equal distance from A and C. Draw a solid line to show the footpath.
- A goat is tethered in the field at point C. The rope is 20 m long. Shade the area where the goat can graze.
- There is a drainage ditch from X to Y. It is always 10 m from the edge of the field. Draw this ditch on the plan. (Part of the ditch has been drawn for you.)

25 Designing questionnaires

Look at these questions. Criticise each question.

1 Are you good at maths?

Criticism

.....

.....

.....

☐

2 How old are you? Tick one box only.

Under 10 ☐

10-20 ☐

20-30 ☐

30-40 ☐

Over 40 ☐

Criticism

.....

.....

.....

☐

3 Which is your favourite sport? Tick one box.

Netball ☐

Rounders ☐

Hockey ☐

Criticism

.....

.....

.....

☐

4 Do you watch TV often?

Yes ☐ No ☐

Criticism

.....

.....

.....

☐

Minimum mark

Circle grade

4	3	2	1	
A	B	C	D	E

4

26 Hypothesis

How could you test these hypotheses?

Choose from experiment, observation or questionnaire.

- | | | | |
|----|---|---------|--------------------------|
| 1 | Boys can thread a needle quicker than girls. | 1..... | ☐ |
| 2 | The most popular food in the canteen is chips. | 2..... | ☐ |
| 3 | Most boys like football. | 3..... | ☐ |
| 4 | Boys can throw the javelin further than girls. | 4..... | ☐ |
| 5 | Girls spend more money on clothes than books. | 5..... | ☐ |
| 6 | Most boys own a bicycle. | 6..... | ☐ |
| 7 | Most pupils wear a tie in school. | 7..... | ☐ |
| 8 | Most teachers can speak French. | 8..... | ☐ |
| 9 | The most popular colour of car is blue. | 9..... | ☐ |
| 10 | If a slice of toast with butter on one side is
knocked off the table, it will land butter side
down most often. | 10..... | ☐ |

Minimum mark

Circle grade

8	6	5	3	
A	B	C	D	E

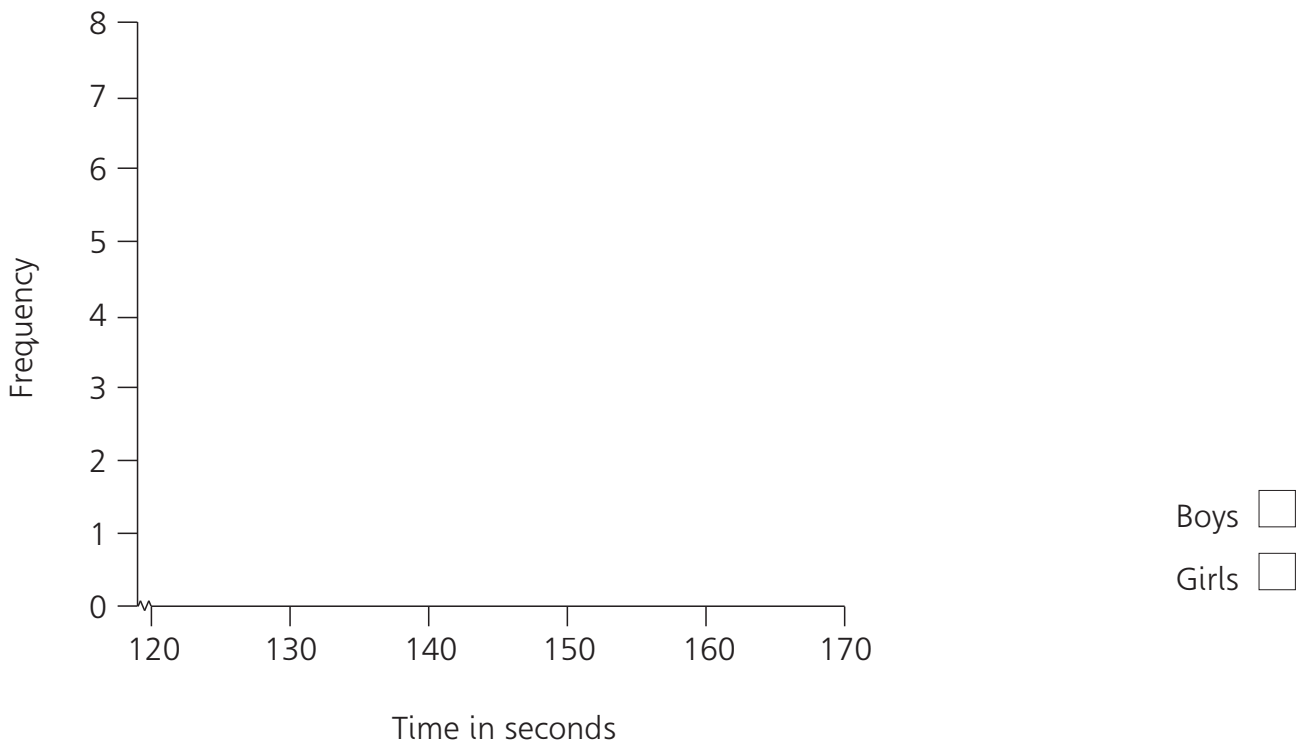
10

27 Comparing data

This table shows the time taken, in seconds, for 20 boys and 20 girls to run 800 m.

Seconds	Boys	Girls
120 – under 130	1	0
130 – under 140	6	2
140 – under 150	8	4
150 – under 160	3	8
160 – under 170	2	6

- a Present this data in a frequency polygon. ----- Boys
Use a dotted line for boys and a solid line for girls. ————— Girls



- b Compare the distributions and comment on your findings.

.....

.....

.....

.....

Comparison..... ☐

Minimum mark
Circle grade

3	2		1	
A	B	C	D	E

3

28 Grouped data

- 1 This table shows the distance, in metres, 200 golfers hit their drives:

Distance in metres	160 – under 170	170 – under 180	180 – under 190	190 – under 200	200 – under 210
Frequency	78	53	4	19	46

- a What is the modal class? 1a ☐
- b Estimate the median. 1b..... ☐
- c Estimate the mean. 1c..... ☐

- 2 This table shows the prices of bicycles in a cycle shop:

Price £	£60 – under £80	£80 – under £100	£100 – under £120	£120 – under £140	£140 – under £160	£160 – under £180
Frequency	196	138	53	68	315	30

- a What is the modal class? 2a ☐
- b Estimate the median. 2b..... ☐
- c Estimate the mean. 2c..... ☐

Minimum mark
Circle grade

5	4	3	2	
A	B	C	D	E

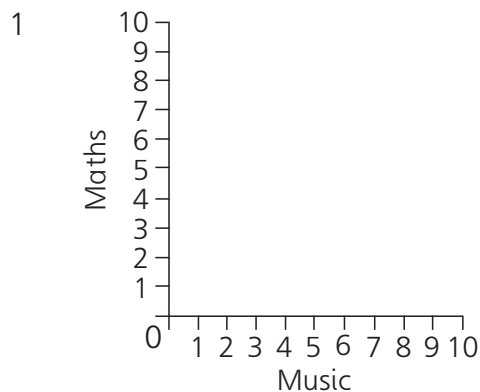
6

29 Scatter diagrams (line of best fit)

Ten pupils took some tests. They received marks out of ten.

Pupil \ Subject	Anna	Ben	Carol	David	Eve	Fred	Gillian	Henry	Isla	John
Maths	9	9	2	7	4	10	8	8	5	3
Music	10	9	2	6	4	10	7	8	4	2
PE	6	10	1	5	9	2	4	8	6	4
English	5	1	9	5	3	8	7	3	4	6

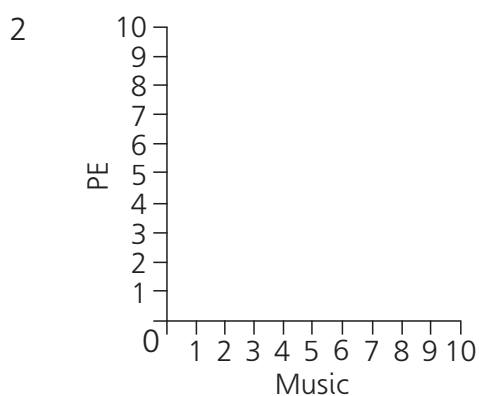
- Complete these scatter diagrams.
- Describe the relationship shown by each scatter diagram.
- Draw a line of best fit where appropriate.



1a ☐

1b..... ☐

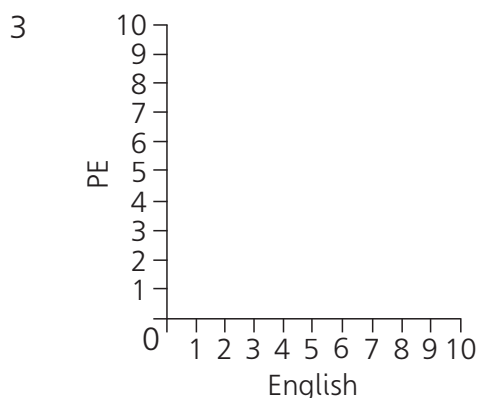
1c..... ☐



2a ☐

2b..... ☐

2c..... ☐



3a ☐

3b..... ☐

3c..... ☐

Minimum mark

Circle grade

7	5	4	2	
A	B	C	D	E

30 Estimation of probability by experiment

- 1 Sarah recorded the colours of 200 cars.
The table shows the results:

Colour	White	Red	Blue	Green
Frequency	76	82	17	25

Use the results to estimate the probability of the colour of the next car being:
(Write your answer as a decimal.)

- a White

1a
- b Red

1b.....
- c Blue

1c.....
- d Green

1d

- 2 5000 cases of wine were damaged in an accident.
100 cases were examined and the following number of bottles were broken in each case.

Bottles broken	0	1	2	3	4	5
Frequency	8	17	24	28	18	5

- a If an unchecked case is opened at random, what is the probability that it will contain:
(Write your answer as a decimal)

i Two broken bottles?

2ai

ii Four broken bottles?

2aii.....
- b Estimate the number of cases with exactly:

i Four broken bottles.

2bi.....

ii Five broken bottles.

2bii.....

Minimum mark
Circle grade

7	5	4	2	
A	B	C	D	E

8