11+ Maths

Ages 10-11

The 10-Minute Tests

CGP

Maths

For GL & other test providers

10

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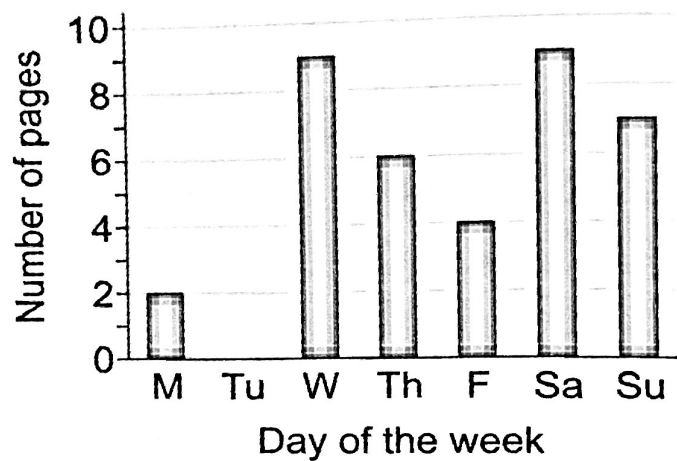
Contents

Test 1

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. What is 278661 rounded to the nearest thousand?

   Answer: _____

2. Lisa is reading a book. The number of pages she reads each day in one week is shown in a bar chart.

   How many pages of the book does Lisa read on the weekend?

   Answer: _____

3. What is the volume of a cube with side length 5 cm? Circle the correct option.

   A   25 cm³

   B   125 cm³

   C   100 cm³

   D   15 cm³

   E   50 cm³

4. Dr. Kapur has a 5 litre jug of water. She pours half on her plants, then gives 1600 ml to patients. How much water is left? Circle the correct option.

   A   900 ml

   B   1.3 l

   C   0.8 l

   D   2400 ml

   E   1100 ml

5. Sundeep has six pencils on his desk. The lengths of the pencils are listed below.

   6 cm, 13 cm, 14 cm, 9 cm, 6 cm, 7 cm

   He picks up the three longest pencils. What is the mean length of these three pencils? Circle the correct option.

   A   14 cm

   B   13 cm

   C   12 cm

   D   9 cm

   E   10 cm

6. A swimming pool has a diving board that is 350 cm above the surface of the water. The depth of the pool is 4.6 m. What is the distance, in metres, between the diving board and the bottom of the pool?

   Answer: _____ m

7. | 64 × 188 = 12 032 |

   What is 64 × 376? Circle the correct option.

   A   12 032

   B   6016

   C   48 128

   D   24 064

   E   24 016

8. A sequence starts 1, 5, 21, 85, ...
   Each term is found by multiplying the previous term by 4 and adding on 1.

   Which of these numbers does not appear in the sequence?
   Circle the correct option.

   A   5461

   B   45 218

   C   87 381

   D   349 525

   E   5 592 405

9. Jane is thinking of a number. She adds 5 and multiplies it by 7. The result is 91.
   Which equation correctly describes Jane's process, if the number
   she started with was x? Circle the correct option.

   A $x + 5 \times 7 = 91$

   B $7(x + 5) = 91$

   C $(x + 5) + 7 = 91$

   D $5x + 7 = 91$

   E $7(5x) = 91$

10. A triangle has sides with lengths a, b and c.
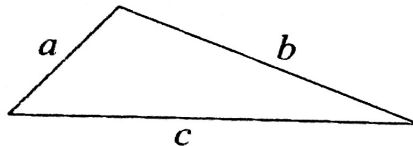
   Which of the following statements is definitely not true? Circle the correct option.

   A $a + b > c$

   B $c + b = 18$

   C $b > a + c$

   D $0 < b + a$

   E $a < b < c$

   / 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. In which of the following numbers does the 6 have the smallest value?
   Circle the correct option.

   A   160523
   B   22864
   C   797617.5
   D   8926.53
   E   60.0849

2. One of the angles in a right-angled triangle is 72°.

   Which of the following is also an angle in the triangle? Circle the correct option.

   A   18°
   B   108°
   C   96°
   D   26°
   E   38°

3. Tony's lasagne recipe is for 12 people, and needs 800 ml of tomato sauce.
   If Tony makes a lasagne for 18 people, how much tomato sauce does he need?

   Answer: _____ ml

4. How many prime numbers are multiples of 5?
   Circle the correct option.

   A   0
   B   1
   C   2
   D   5
   E   Impossible to tell

5. Julie is watching a film. After 35 minutes, she has watched 25% of the film. What is the total length of the film? Circle the correct option.

   A   2 hours 10 minutes

   B   3 hours 10 minutes

   C   2 hours 45 minutes

   D   1 hour 40 minutes

   E   2 hours 20 minutes

6. Jonah has a bag with red balls and blue balls. The bag contains twice as many red balls as blue balls. What fraction of balls in the bag are blue? Circle the correct option.

   A $\frac{1}{3}$

   B $\frac{1}{2}$

   C $\frac{2}{3}$

   D $\frac{2}{5}$

   E $\frac{3}{7}$

7. Joan is stacking boxes in a pile. Each box is a cuboid of height 15 cm and mass 0.2 kg. Joan stacks the boxes to a total height of 240 cm. What is the total mass of the stack of boxes? Circle the correct answer.

   A   3.2 kg

   B   1.6 kg

   C   4.8 kg

   D   2.6 kg

   E   1.8 kg

8. James wants to run at least 500 m by doing laps around the perimeter of a park, shown below.
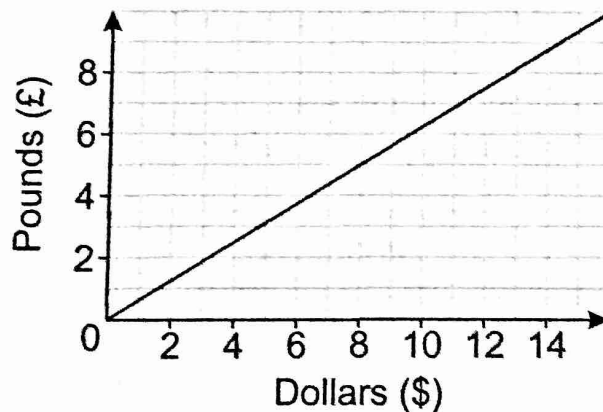
50 m

30 m   Park

not to scale
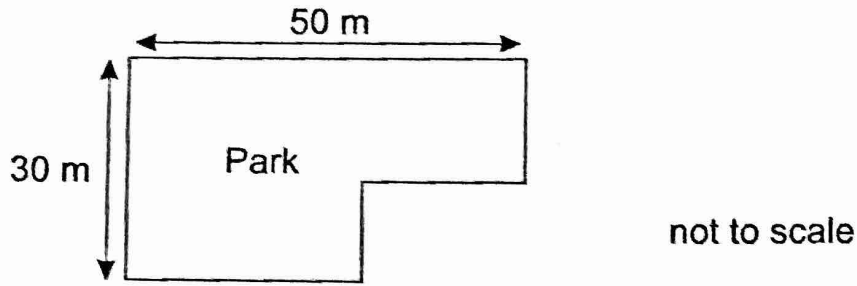
What is the smallest number of whole laps that he must run?

Answer: _____

9. If $4(x + 5) = 44$, what is x? Circle the correct option.

   A 8   **B** 11   **C** 6   **D** 35   **E** 7

10.

Pounds (£)

8
6
4
2
0
   2   4   6   8   10 12 14
Dollars ($)

Rachel has £8. Simon has $12. Who has more money, and by how much?
Use the conversion graph to give an estimate. Circle the correct option.

   A   Rachel has about $0.40 more than Simon.
   B   Rachel has about $0.80 more than Simon.
   C   Rachel has about £1.50 more than Simon.
   D   Simon has about $2.50 more than Rachel.
   E   Simon has about £0.20 more than Rachel.
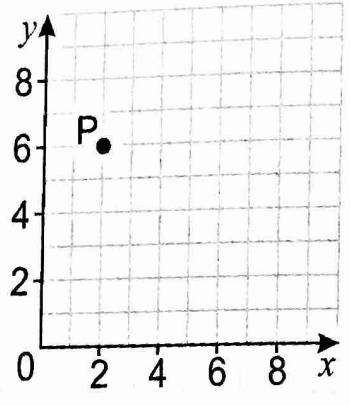
/ 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. On the coordinate grid, point P is moved 7 squares right and 2 squares down.

What are the new coordinates of point P?

Answer: (_____, _____)

2. Gerard sells four types of sandwich in his cafe.
   He records the number of each type of sandwich sold on one day in a pictogram.

| Sandwich	Amount sold	☐ = 4 sandwiches
Piccalilli	☐ ☐ ☐ ◺	
Ham and cheese	☐ ☐ ☐ ☐ ☐ ☐	
BLT	☐ ▷	
Egg mayo	☐ ☐ ☐ ▷	

How many more piccalilli sandwiches were sold than BLT on that day?

Answer: _____

3. Which of the following is the smallest? Circle the correct option.

    A   4%

    B   0.65

    C $^3/_{100}$

    D   0.065

    E $^1/_{20}$

4. An empty steel bucket has a mass of 850 g. When it is filled with sand, it has a mass of 16.2 kg. What is the total mass of the sand in the bucket? Circle the correct option.

    A   15 550 g

    B   15 350 g

    C   17 050 g

    D   16 950 g

    E   14 650 g

5. Tifah makes a cube with side length 2 cm out of card. What is the area of the net that she needs to make the cube? Circle the correct option.

    A   8 cm²

    B   16 cm²

    C   20 cm²

    D   24 cm²

    E   32 cm²

6. Mrs Rogers has stickers in different shapes. She has four square stickers, three triangle stickers and one heart sticker.

What fraction of all her stickers are square? Circle the correct option.

    A $^1/_8$

    B $^1/_3$

    C $^4/_9$

    D $^3/_7$

    E $^1/_2$

7. Chris leaves his house, and is out for four hours and twenty minutes, before arriving back at his house at 7:15 pm. At what time did he leave his house?

Answer: _____ : _____ p

8.
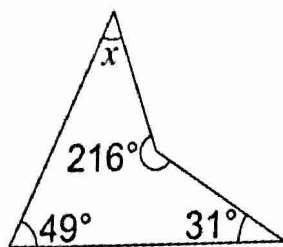
not drawn accurately

What is the size of angle x? Circle the correct option.

A   28°

B   64°

C   22°

D   46°

E   84°

9. What is $49 \times 138 - 37 \times 49$?

Answer: _____

10. A sequence is made by joining together squares with side length 1.
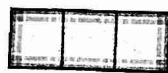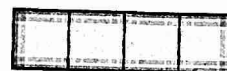
Shape 1   Shape 2   Shape 3   Shape 4

Which expression gives the perimeter of the nth shape? Circle the correct option.

A $4n$

B $4n - 1$

C $3n + 4$

D $3n + 1$

E $2n + 2$

/ 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1.   What is the difference between 18 °C and –25 °C?

<div align="right">Answer: _____ °C</div>
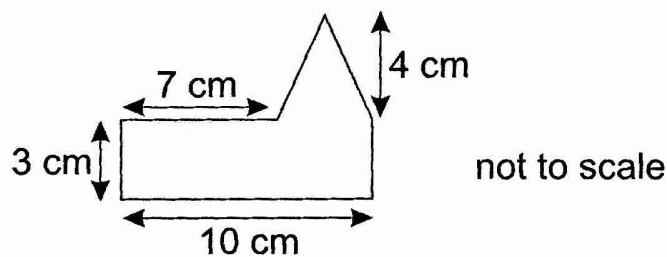
2.   Which number is a factor of both 48 and 27? Circle the correct option.

     A   2

     B   3

     C   4

     D   7

     E   9

3.   The sizes of three of the angles in a quadrilateral are 47°, 133° and 95°.
      What is the size of the missing angle? Circle the correct option.

     A   108°

     B   85°

     C   25°

     D   125°

     E   90°

4.   Work out the area of the shape below.

not to scale

<div align="right">Answer: _____ cm²</div>

5. A company has crates that weigh 14.68 kg each. A shipping container can hold 1024 crates. What is the total weight of the crates in five full containers? Circle the correct option.

A   25 191.2 kg

B   75 161.6 kg

C   102 510.8 kg

D   117 493.2 kg

E   205 265.4 kg

6.

| Di's DIY Shop	
Hammer	£2.50
10 nails	5p

Terry buys a hammer and 50 nails from Di's DIY Shop.
How much change does he get from £10? Circle the correct option.

A   £3.75

B   £5.00

C   £6.50

D   £7.00

E   £7.25

7. The heights of Janet's plants are 19 cm, 25 cm, 28 cm and 32 cm. What is the mean height of Janet's plants? Circle the correct option.

A   7 cm

B   19 cm

C   26 cm

D   26.5 cm

E   104 cm

8. A shop owner claims that the number of eggs he sold on Sunday is over double the number he sold on Friday. He uses the chart below to back up his claim.
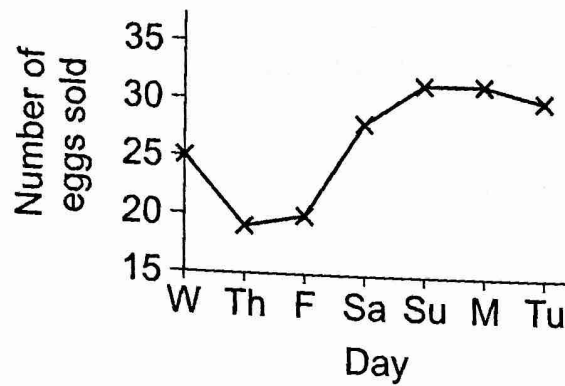
Why is the chart misleading? Circle the correct option.

A It's hard to read the number of eggs sold.
B The numbers don't start at 0.
C The days don't start on Monday.
D The shop is probably open for less time on a Sunday.
E The numbers should go up in 1s or 2s.

9. Which expression is the same as $3(x + 2) - 1$? Circle the correct option.

A $3x + 1$
B $x + 1$
C $6x - 1$
D $3x + 5$
E $5x - 1$

10. Sofia is giving out hats at her birthday party. She has five each of red, blue and green hats. The first person is given a blue hat, and the second person is given a green hat. What fraction of the remaining hats are red? Circle the correct option.

A $4/15$
B $3/13$
C $5/13$
D $1/3$
E $1/5$

/ 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.
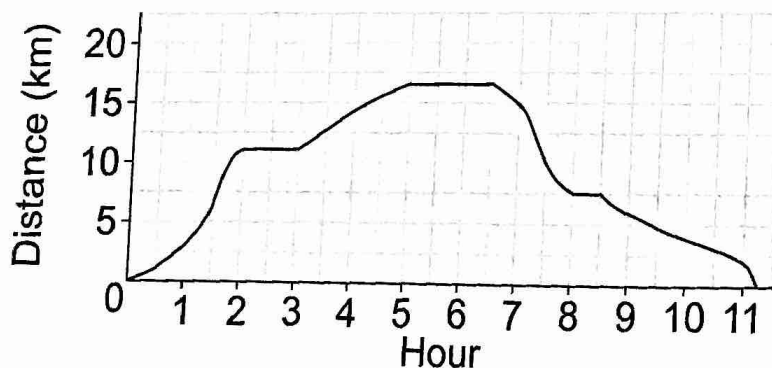
1. Use estimating to find 67 132 + 9840.78 + 812.5. Circle the correct option.

   A   17 368.78

   B   77 785.28

   C   166 352.3

   D   107 504.6

   E   2467.898

2. In one season, a football team plays 60 matches. They draw 15% of their matches. How many matches does the team draw? Circle the correct option.

   A   15

   B   5

   C   6

   D   9

   E   12

3. Mel goes fell-running one day. The graph below shows her distance from home.

How long in total did Mel stop for during her run?

Answer: _____ hours, _____ minutes

14

4. 1 pint = 568 ml. A shop only sells milk in 1 pint cartons.
   How many cartons would you need to buy to get at least 6 litres of milk?

   Answer: _____

5. Which of the following statements is true? Circle the correct option.

   A   16 × 30 > 8 × 800
   B   15 × 30 < 30 × 15
   C   20 × 25 = 10 × 12.5
   D   18 × 24 = 9 × 48
   E   45 × 1000 > 900 × 100

6. Shapes 1 and 2 are both made from identical regular hexagons.
   In Shape 1, the white space in the middle of the 3 hexagons has an area of 8 cm².

   Shape 1   Shape 2
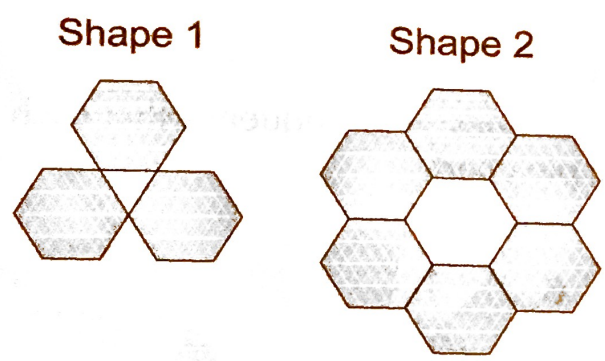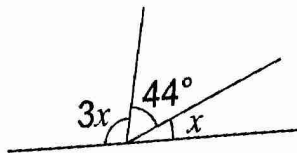

   What is the area of the white space in the middle of the 6 hexagons in Shape 2?
   Circle the correct option.

   A   24 cm²
   B   16 cm²
   C   48 cm²
   D   80 cm²
   E   8 cm²

7. The test scores of Mr Colin's class are: 6, 19, 20, 11.
   What is the mean of these scores?

   Answer: _____

8. The diagram shows three angles on a straight line.

What is the size of angle x? Circle the correct option.

    A $136°$

    B $44°$

    C $39°$

    D $36°$

    E $34°$

9. What is the sum of the only two prime numbers between 50 and 60?

Answer: _____

10. An unfair dice is rolled 36 times. The frequency that each number is rolled is shown in the pie chart.
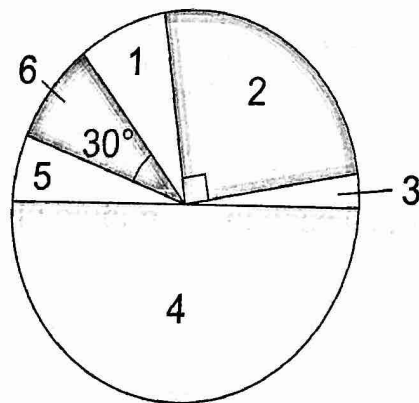
How many times does the dice land on an odd number? Circle the correct option.

    A   4

    B   6

    C   10

    D   12

    E   18

/ 10

Time for a break! These puzzles are a great way to practise your maths skills.

Moon, Star, Diamond, Circle

Each shape has a whole number value. Work out the value of each shape, and write the sum of each row and column in the box at the end.

🌙 = ____

☆ = ____

◆ = ____

○ = ____

○	○	☆	🌙	☐
🌙	🌙	🌙	🌙	36
☆	◆	◆	☆	18
☆	🌙	☆	☆	☐
☐	24	☐	26	

Larry's Test

Larry's class does a test marked out of 100.
All of the scores except Larry's are shown here:

93, 88, 76, 44, 28, ?

What could Larry's score be if:

the difference between the highest and lowest mark is 70? _____

the most common score is 88? _____

the mean score is 55? _____

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. Daphne bought a painting at an antiques fair for £635. She sold it one month later for £990. Circle the amount of profit she made.

   A   £335

   B   £355

   C   £445

   D   £265

   E   £255

2. A potted plant costs £4.50. There is a special offer of buy one get one free. How much would it cost to buy 20 potted plants?

   Answer: £_____

3. Kemi cuts the shapes below out of a piece of card.

   What fraction of the shapes are triangles? Circle the correct answer.

   A $\frac{1}{6}$

   B $\frac{1}{3}$

   C $\frac{2}{3}$

   D $\frac{5}{6}$

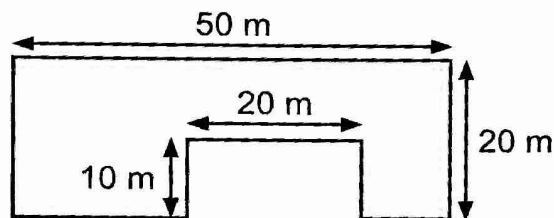   E $\frac{1}{2}$

4. Which of the following is equal to $\frac{23}{5}$? Circle the correct answer.

   A   4.3   B   4.6   C   5.4   D   3.8   E   4.2

18

5. A triangle has one angle of 51° and one angle of 72°.
What is the size of the triangle's third angle? Circle the correct answer.

A 51°

B 72°

C 123°

D 57°

E 237°

6. The diagram shows the plan of a concrete platform.

What is the area of the platform?

Answer: _____ m²

7. Pete delivers newspapers. The table below shows the number of newspapers he delivered each morning during one week.

Mon	Tue	Wed	Thu	Fri	Sat	Sun
15	15	16	14	10	30	40

What was the mean number of newspapers he delivered during this week?
Circle the correct answer.

A 14

B 15

C 16

D 20

E 25

Test 6

8. Sophie sets off from home at 09:00 and jogs to the beach. She then sits on a bench to rest, before jogging home again. The graph below shows her distance from home during her journey.
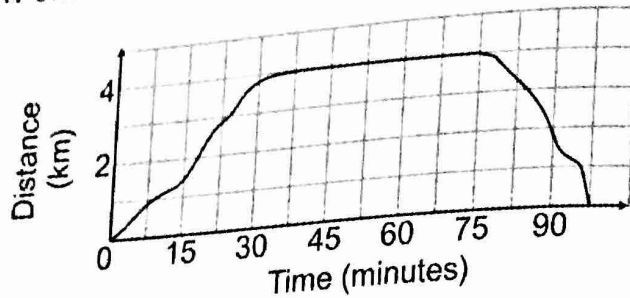
Circle the time that she sets off back home.

A   09:15

B   09:45

C   10:00

D   10:15

E   10:30

9. What is the sixth term in the sequence shown?

73, 71, 68, 64...

Answer: _____

10. Mr Stark has two jars of sweets on his desk.
At the start of the week, each jar contains *S* sweets.
Mr Stark gives out 30 sweets during the week.

Circle the expression that shows the total number of sweets he has left at the end of the week.

A $30 - 2S$

B $2S - 30$
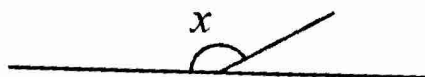
C $2 - S - 30$

D $30S - 2S$

E   28

/ 10

Test 6

20

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. A regular heptagon has sides of length 120 mm. What is the heptagon's perimeter? Circle the correct answer.

    A   1200 mm

    B   840 mm

    C   480 mm

    D   600 mm

    E   720 mm

2. Look at the diagram below.

    Circle the best estimate for the size of angle *x* from the options below.

    A   100°

    B   30°

    C   230°

    D   150°

    E   330°

3. Mikael walks 740 m to the bus stop. He travels 2.5 km on the bus, and then walks another 120 m to his grandparents' house. How far has he travelled altogether, in km? Circle the correct answer.

    A   8.625 km

    B   3.2 km

    C   3.36 km

    D   10.11 km

    E   11.1 km

4. Patty is thinking of a number. She subtracts 6 and multiplies the result by 8. The result is 96. What number was she thinking of?

Answer: _____

5. Brian buys a microwave from a supermarket for £70. The following week, the supermarket has a sale on electrical items. The microwave is reduced by 15%. How much money would Brian have saved if he had bought the microwave in the sale?
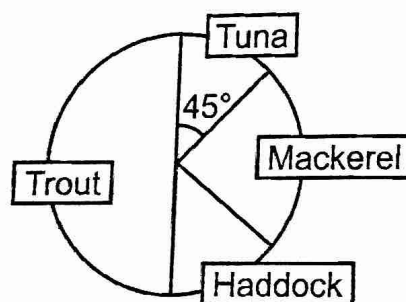
Answer: £ _____

6. The diagram shows a metal container in the shape of a cuboid.
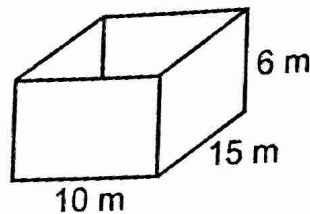
A builder pours cement into the container until it is ⅓ full. What is the volume of cement in the container?

Answer: _____ m³

7. Mrs Ormerod asked the members of her class to name their favourite fish. She recorded the results in the pie chart shown below.

Four members of her class said that tuna was their favourite. How many members of her class said that trout was their favourite?
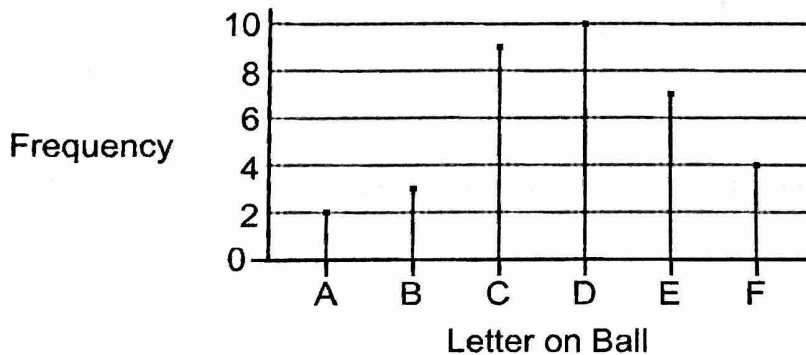
Answer: _____

8. The nth term in a sequence is given by the formula $20 - 4n$.
    What is the fifth term in the sequence? Circle the correct answer.

    A   20
    B   5
    C   4
    D   0
    E   −5

9. Simone and Callum are collecting conkers.
    Between them, they have collected a total of 29 conkers.
    Which of the following statements could be true? Circle the appropriate letter.

    A   Callum and Simone have each collected the same number of conkers.
    B   Callum has collected half as many conkers as Simone.
    C   Callum and Simone have each collected an even number of conkers.
    D   Callum and Simone have each collected an odd number of conkers.
    E   Callum has collected one more conker than Simone.

10. Six balls, labelled A-F, are placed in a hat. A number of people are asked to pick
    out a ball at random. The graph shows the number of times each ball is picked.

    What fraction of the people picked the ball marked 'D'? Circle the correct answer.

    A $^3/_5$
    B $^2/_7$
    C $^4/_9$
    D $^3/_7$
    E $^7/_{10}$

    / 10

1. Round 13695 to the nearest 10.

   Answer: _____

2. Circle the most suitable unit for measuring the depth of a well.

   A ml

   B m^2

   C m

   D m^3

   E mm

3. Lizzy is drawing a table to show the number of sandwiches sold in a cafe one lunch time. She has filled in part of the table.

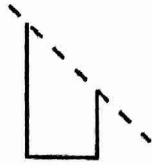 | | White Bread | Brown Bread | Total |
   |--------|-------------|-------------|-------|
   | Cheese | 12 | | |
   | Turkey | | 16 | 35 |
   | Total | | | 80 |

   How many people chose cheese on brown bread? Circle the correct answer.

   A 12

   B 16

   C 45

   D 33

   E 64

4. Sutinder wraps china cups in newspaper to store in his attic. One newspaper can wrap up 7 cups. How many newspapers does Sutinder need to wrap 161 cups?
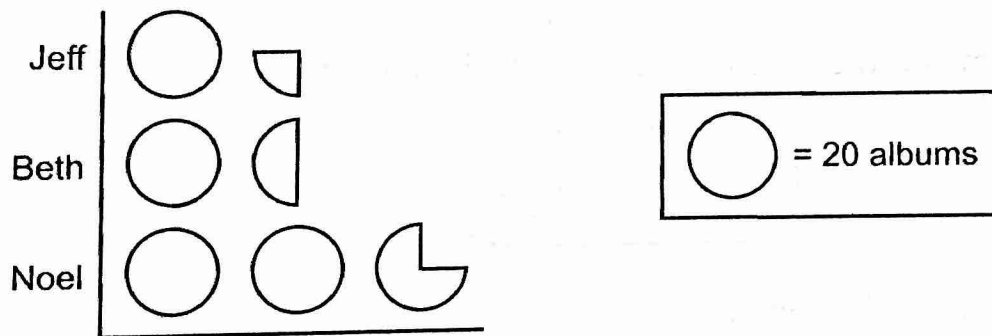
   Answer: _____

5. The shape below is reflected in the dotted mirror line.

The shape and its reflection together make a new shape.
Circle the name of the new shape.

    A   Pentagon

    B   Hexagon

    C   Quadrilateral

    D   Octagon

    E   Heptagon

6. The pictogram shows the number of albums owned by three music fans.
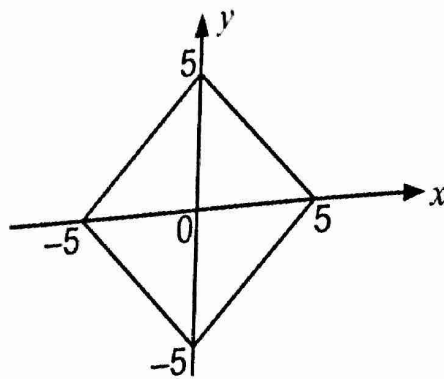
Jeff

Beth

Noel

◯ = 20 albums

How many more albums does Noel own than Jeff?

Answer: _____

7. Which of these pairs of numbers are an equal distance from 16.5?
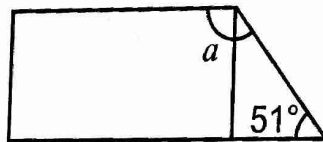Circle the correct answer.

    A   16.2 and 17.2

    B   16 and 18

    C   15 and 17

    D   15.9 and 17.1

    E   15.8 and 17.3

8. Look at the diagram shown below.

Which of these points is outside the shaded shape? Circle the correct answer.

A   (–2, 0)

B   (1, –1)

C   (–5, 5)

D   (0, –3)

E   (4, 0)

9. The diagram below shows a rectangle attached to a right-angled triangle.

What is the size of angle a?

Answer: _____

10. Alicia is a taxi driver. She charges a flat rate of £4 per journey, plus 80p per mile travelled. Circle the expression which shows the amount she would charge, in pounds, for a journey of d miles.

A $4d + 0.8$

B $4 + 80d$

C $4.80d$

D $480 + d$

E $4 + 0.8d$

/10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. The timetable below shows the times that a bus stops in five different towns.

Flarehaven	Poolton	Leveleys	Livham	Vansdell
0900	0946	1021	1059	1132

   Charles gets on the bus in Poolton.
   How long, in minutes, does it take him to get to Vansdell?

   Answer: _____ minutes

2. Circle the shape below which is not the same as the others when rotated.
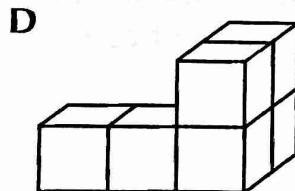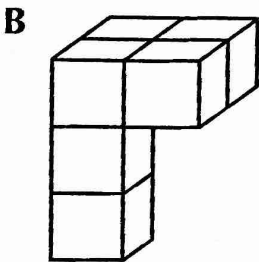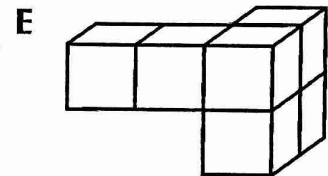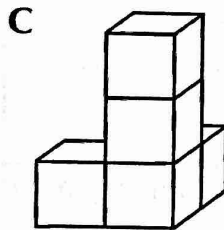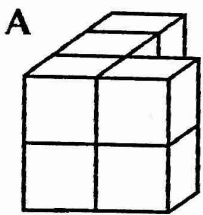
3. Which of these is equal to three thousand and twenty-five millilitres?
   Circle the correct answer.

   A   3.025 litres

   B   3.25 litres

   C   3025 litres

   D   0.325 litres

   E   0.3025 litres

4. A farmer uses 45 kg of hay to feed five horses for one day.
    How many kilograms of hay would she need to feed 8 horses for one day,
    if each horse eats the same amount of hay?

    Answer:

5. Hank writes down all the factors of 30.
    He then circles any of them which are also multiples of 3.
    How many numbers does he circle?

    Answer:

6. The chart below shows the number of games won by each
    player in a snooker tournament.
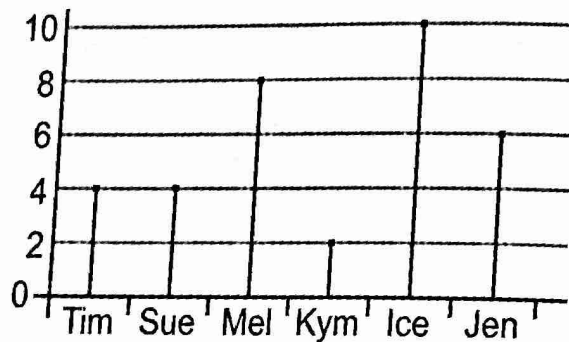
    Which three players won a combined total number of games
    which was the same as the number of games won by Ice?
    Circle the correct answer.

    A   Tim, Sue and Mel
    B   Tim, Sue and Kym
    C   Sue, Mel and Kym
    D   Sue, Kym and Jen
    E   Mel, Kym and Jen

7. What is the angle of the 'Amber' section in the pie chart shown?
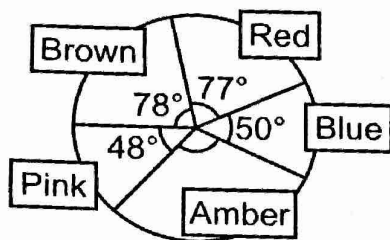
Not drawn accurately

Answer: _____°

8. Kevin buys a box of corn flakes for £1.40 and some chocolate for £1.50. Using these ingredients, he makes corn flake cakes, and sells them for £1 each.

If Kevin sells ten corn flake cakes, how much profit does he make?

Answer: £ _____

9. A square has a perimeter of 48 m. What is its area? Circle the correct answer.

A   48 m²
B   12 m²
C   144 m²
D   132 m²
E   96 m²

10. Raj is thinking of a number. He divides it by 2, subtracts 15, and then multiplies the result by 8. Which of the following expressions shows the result if the number he started with was x? Circle the correct answer.

A $x \div 2 - 15 \times 8$
B $(x - 15) \div 2 \times 8$
C $x \times 8 \div 2 - 15$
D $x \div (2 - 15 \times 8)$
E $8(x \div 2 - 15)$

/ 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. What is 52.45 × 8.98? Circle the correct answer.

   A   47.1001
   B   471.001
   C   4710.01
   D   47100.1
   E   471001

2. Ricky buys 3 bags of crisps for 37p each. He pays with a £2 coin.
   How much change does he receive, in pence?

   Answer: _____p

3. George carries out a survey. He asks a group of people to say how many fizzy
   drinks they all consumed during one week. The pie chart shows the results.
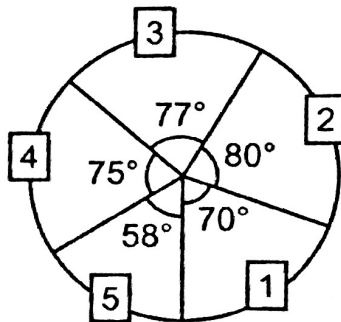
   What was the most common response? Circle the correct answer.

   A   1
   B   2
   C   3
   D   4
   E   5

4. What is the perimeter of the shape shown below?

1 m

1.5 m   1.5 m   1 m
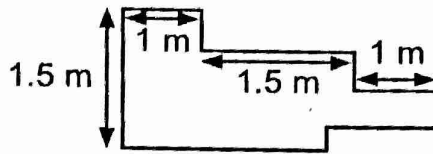
Not drawn to scale

Answer: _____ m

5. A quadrilateral contains three angles of size 81°.
   What is the size of the fourth angle?

Answer: _____°

6. Look at the sequence of patterns below.

Pattern 1   Pattern 2   Pattern 3   Pattern 4

How many dots will there be in the sixth pattern?

Answer: _____

7. The table shows the finishing times, in seconds, of the runners in a 100 m sprint.

Dinah	Tabby	Pam	Debbie	Moirah	Jill	Summer
15.45	14.97	15.21	15.12	15.35	16.01	16.13

Circle the option which correctly shows the first, second and third placed finishers.

A   First Place: Tabby   Second Place: Pam   Third Place: Debbie
B   First Place: Jill   Second Place: Debbie   Third Place: Summer
C   First Place: Tabby   Second Place: Jill   Third Place: Summer
D   First Place: Debbie   Second Place: Pam   Third Place: Moirah
E   First Place: Tabby   Second Place: Debbie   Third Place: Pam

8. The graph below shows how the temperature of a chemical changed over time during an experiment.
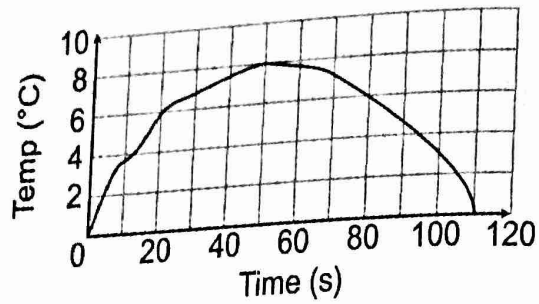
After how many seconds did the chemical reach its highest temperature?

Answer: _____

9. Sanjeev lays out the cards shown below.

What fraction of the cards have one or more lines of symmetry?
Circle the correct answer.

A $\frac{1}{10}$

B $\frac{1}{5}$

C $\frac{2}{5}$

D $\frac{4}{5}$

E $\frac{9}{10}$

10. The cost of hiring a floorboard sander is £60 per day. There is also a one-off hire fee of £150, which covers the whole rental period. Circle the expression which shows the total cost, in pounds, of hiring the sander for n days.

A $60 + 150n$

B $210n$

C $210 + n$

D $150 + 60n$

E $150 \times 60n$

/ 10
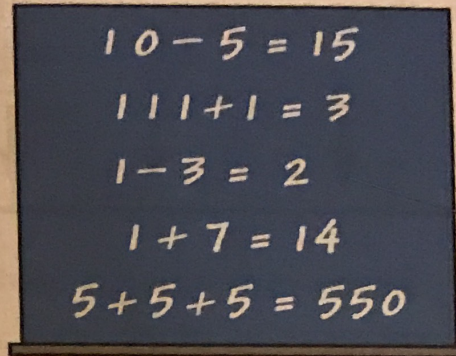
Puzzles 2

Time for a break! These puzzles are a great way to practise your maths skills.

Blackboard Blues

Look at the calculations written on the blackboard.

Can you add **one straight line** to each calculation to make them correct?

$$10 - 5 = 15$$
$$111 + 1 = 3$$
$$1 - 3 = 2$$
$$1 + 7 = 14$$
$$5 + 5 + 5 = 550$$

Hint: You can add the straight line to any part of the calculation — symbol or number.
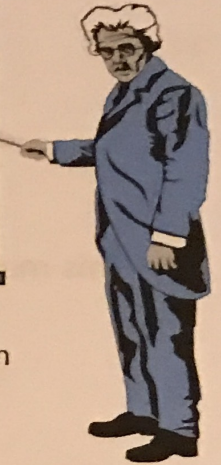
Drawing Straws

The picture below shows nine identical straws arranged to make three equilateral triangles.
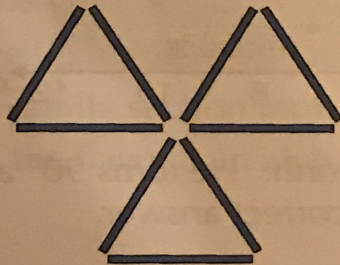
Starting with the shape shown, what is the minimum number of moves it would take to rearrange the straws into the following shapes?

- Four equilateral triangles   _____ move(s)

- Two equilateral triangles   _____ move(s)

- One equilateral triangle   _____ move(s)

(Repositioning one straw counts as a move.)
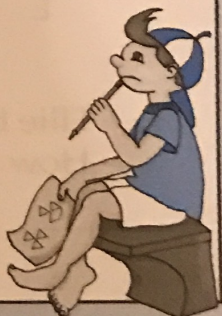
You have **10 minutes** to do this test. Work as quickly and accurately as you ca

1. Which of these arrows is pointing to 1.24? Circle the correct answer.
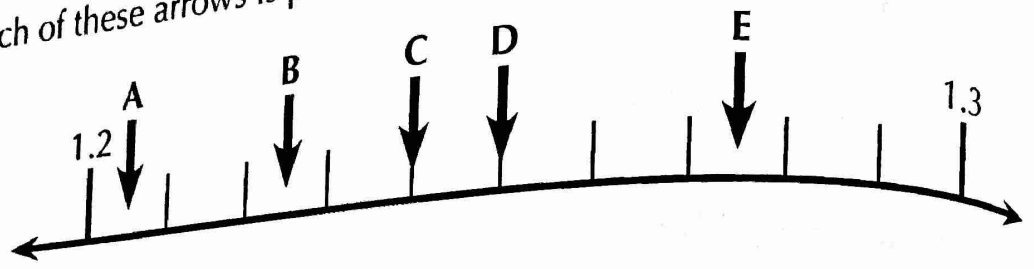
2. This map shows some of the rides at a funfair.
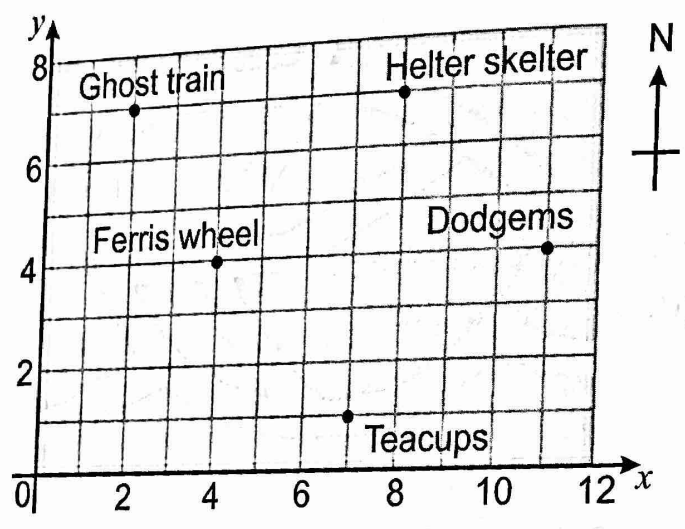
Craig stands at (7, 4), facing north. He turns 90° anticlockwise. What can he see? Circle the correct answer.

A Ghost train

B Helter skelter

C Ferris wheel

D Dodgems

E Teacups

3. Ellie buys four bags of flour for £1.20 each. She pays with a £10 note. How much change does she get?

Answer: £_____

4. The diagram below shows a parallelogram.
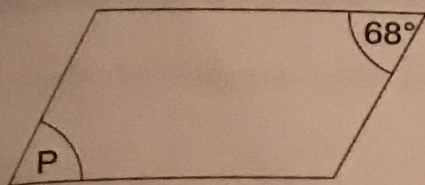
What is the size of angle P? Circle the correct answer.

A   68°   B   112°   C   90°   D   22°   E   34°

5. This pie chart shows the results of a survey.
    80 people were asked which of four milkshake flavours they prefer.
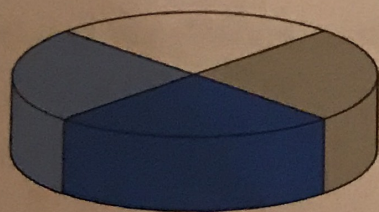
Key
□ Banana
▨ Strawberry
■ Vanilla
▨ Chocolate

Why is the pie chart misleading? Circle the correct answer.

A   100 people should have been questioned.

B   The sections should be coloured to match the flavours.

C   Only four flavours are included.

D   The chart makes the vanilla section look more important than it should.

E   The key does not list the flavours in alphabetical order.

6. Becky buys ten 330 ml cans of lemonade and two 1.5 litre bottles of cola.
    How many litres of drinks does she buy in total?

    Answer: _____ litres

7. Nina, David and Regina sold tickets for a concert.
    Nina sold 1289, David sold 1455 and Regina sold 1606.
    How many tickets did they sell in total?

    Answer: _____

8. Harvey drew the net of a cube of side length 10 cm on a sheet of cardboard, as shown below.
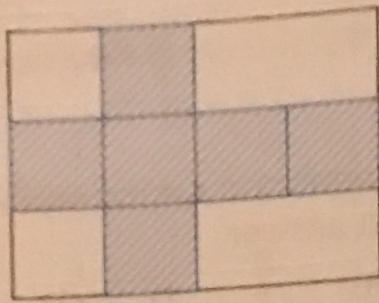
What is the area of the original sheet of cardboard? Circle the correct answer.

A 140 cm²

B 240 cm²

C 600 cm²

D 1000 cm²

E 1200 cm²

9. The mean of five numbers is 180.
Four of the numbers are 155, 162, 190 and 198.

What is the fifth number? Circle the correct answer.

A 165   B 176   C 180   D 195   E 203

10. Alice is A years old. Barney is twice as old as Alice.
Charlene is 4 years younger than Barney.

Charlene is 16. Circle the correct equation below.

A $A + 2A + 4A = 16$

B $2A + 4 = 16$

C $4A - 2 = 16$

D $4A + 2 = 16$

E $2A - 4 = 16$

/ 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. $1562 \times 47 = 73414$

   What is 15.62×47?

   Answer: _____

2. In a 'tallest sunflower' competition, the winning sunflower was 5.76 m tall. The shortest flower in the competition was 2.89 m shorter than the winner.

   How tall was the shortest sunflower in the competition? Circle the correct answer.

   A 2.73 m

   B 2.83 m

   C 2.87 m

   D 2.89 m

   E 3.13 m

3. Penny and Brian went apple picking.
   Penny collected 1.7 kg of apples. Brian collected 1550 g of apples.

   How many kilograms of apples did they collect between them?

   Answer: _____ kg

4. Cecilia, Paul and Art made 12 sandwiches.
   Cecilia ate $5/12$ of the sandwiches. Paul ate $1/4$ of the sandwiches. Art ate the rest.

   How many sandwiches did Art eat? Circle the correct answer.

   A 4 B 5 C 6 D 7 E 8

5. Martina makes the two shapes shown below using identical tiles.
The tiles are equilateral triangles.
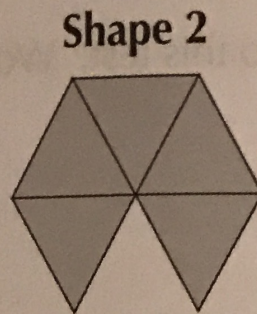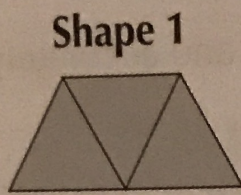
Shape 1

Shape 2

Shape 1 has a perimeter of 30 cm. What is the perimeter of Shape 2?

Answer: _____ cm

6. This design has been made with identically-sized grey and white squares.

How many lines of symmetry does the design have? Circle the correct answer.

   A 0   B 1   C 2   D 4   E 8

7. Amber buys a hat in a sale. The hat normally costs £18, but the price has been reduced by 10%.

How much does Amber pay for the hat? Circle the correct answer.

   A   £8

   B   £15.80

   C   £16.20

   D   £17.72

   E   £19.80

8. A group of friends won £6000 in a competition.
They shared the money equally, and each person received £750.

How many friends were there in the group? Circle the correct answer.

   A 5   **B** 6   **C** 7   **D** 8   **E** 9

9. The first five numbers in a sequence are: 100, 98, 94, 88, 80.
What will the seventh number in the sequence be?

Answer: _____

10. This graph shows the progress of a charity fundraising campaign.
The total amount raised since the start of the campaign was
recorded at the end of each week.
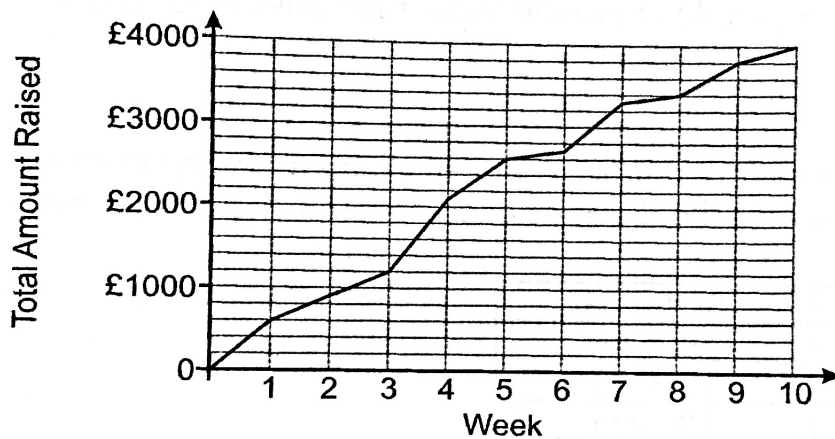
How much money was raised during the fourth week? Circle the correct answer.

   A   £450
   B   £600
   C   £850
   D   £900
   E   £2100

/ 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. A group of people were asked which of six animals would make the best mascot for their local football team. This chart shows the results of the survey.
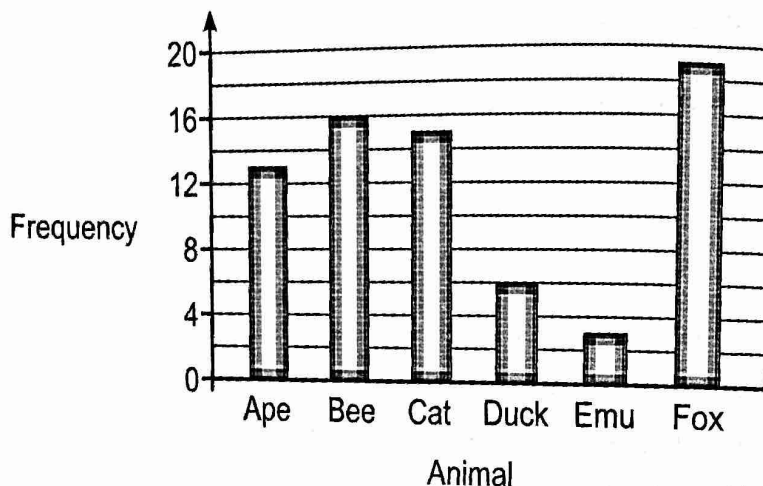
How many more people answered 'Ape' than answered 'Duck'?

Answer: _____

2. Six competitors took part in a paper aeroplane throwing competition. The list below shows the distance each competitor's aeroplane flew.

Name	Distance
Abigail	18.6 m
Alexei	17.89 m
Cooper	18.25 m
Li	18.04 m
Dina	17.9 m
Zora	18.31 m

The competitors were ranked by their distance, from longest to shortest. Who threw the next longest distance after Cooper? Circle the correct answer.

A   Abigail

B   Alexei

C   Li

D   Dina

E   Zora

not to be photocop

3. Bella's hens have laid 76 eggs. She puts the eggs into egg boxes. If each box holds six eggs, how many boxes will Bella need?

Answer: _____

4. The sketch below shows the coordinates of three corners of a rhombus.
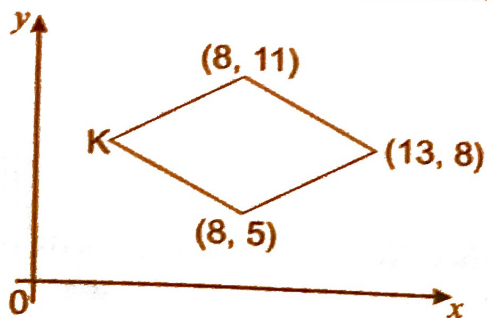
What are the coordinates of point K?

Answer: (_____ , _____)

5. Clive buys 5.5 m of copper wire. He uses 75 cm of the wire.

How much wire is left? Circle the correct answer.

   A   4.3 m
   B   4.55 m
   C   4.6 m
   D   4.75 m
   E   5.15 m

6. Lucy is designing a logo. She makes two identical squares overlap. The overlapping area is also a square, and is $\frac{1}{4}$ of the area of one of the bigger squares.

If the overlapping area is 9 cm², what is the area of the logo?

Answer: _____ cm²

7. Jenny walked once around the perimeter of a rectangular field. In total, she walked 2650 m. The length of the field is 850 m.

What is the width of the field? Circle the correct answer.

    A   425 m
    B   475 m
    C   900 m
    D   950 m
    E   1800 m

8. Rudy recorded the temperature in his garden five times during a single day. The temperatures he recorded were 14 °C, 24 °C, 27 °C, 27 °C and 18 °C.

Which of the following statements is true? Circle the correct answer.

    A   The difference between the hottest and coldest temperatures was 24 °C.
    B   The maximum temperature was 24 °C.
    C   The third-coldest temperature was 24 °C.
    D   The most common temperature he recorded was 24 °C.
    E   The minimum temperature was 24 °C.

9. What is the size of angle x in the triangle below? Circle the correct answer.
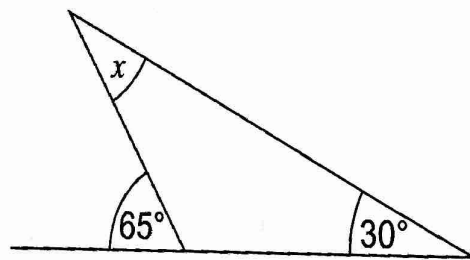
    A   30°   B   35°   C   65°   D   85°   E   115°

10. $3m - 7 = 20$

    Which of the following is the value of m? Circle the correct answer.

    A   27   B   24   C   39   D   9   E   7   /1

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. What number should go in the square?

$$37 + \boxed{} = 121$$

Circle the correct answer.

A 74   **B** 78   **C** 84   **D** 91   **E** 94

2. How many acute angles are there inside a regular pentagon?
Circle the correct answer.

A 0   **B** 1   **C** 2   **D** 5   **E** 6

3. $\boxed{1234 \times 7 = 8638}$

What is 1234×0.7?

Answer: _____

4. This pictogram shows the number of pupils in each of six classes in a school.

Class 1	⬤ ⬤ ⬤ ⬤◖
Class 2	⬤ ⬤ ⬤ ⬤ ⬤◖
Class 3	⬤ ⬤ ⬤ ⬤
Class 4	⬤ ⬤ ⬤ ⬤ ⬤ ⬤
Class 5	⬤ ⬤ ⬤◖
Class 6	⬤ ⬤ ⬤ ⬤◖

Key
⬤ = 4 pupils

The two smallest classes are combined for a school trip.
How many pupils are there in the combined group?

Answer: _____

5. Joey starts watching a film at 14:45. The film lasts for 142 minutes. What time will it be when the film ends? Circle the correct answer.

    A   15:42

    B   16:22

    C   16:57

    D   17:07

    E   17:27

6. Suzy divides a circle into four equally-sized sections. She then divides two of the sections in half. She uses her circle to create the spinner shown below.
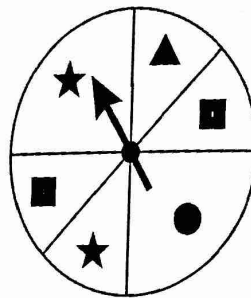
    What fraction of the whole spinner is made up of star sections? Circle the correct answer.

    A $\frac{3}{8}$ B $\frac{1}{4}$ C $\frac{3}{4}$ D $\frac{1}{3}$ E $\frac{3}{5}$

7. What is the volume of this cuboid?

    2.5 cm

    6 cm

    4 cm
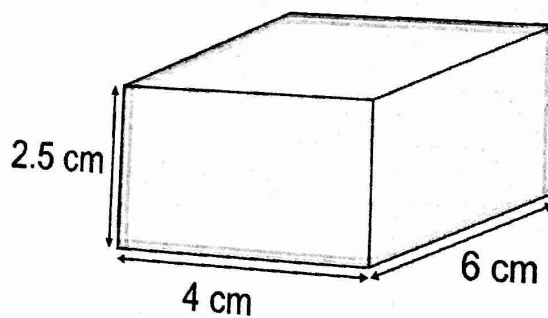
    Circle the correct answer.

    A   12.5 cm³

    B   24 cm³

    C   25 cm³

    D   60 cm³

    E   120 cm³

© CCP — not to be photo

8. Harriet makes some purple paint by mixing 1.75 litres of red paint
    with 480 ml of blue paint and 610 ml of white paint.
    She then uses half of the purple paint on her garden fence.

    How many litres of purple paint does she have left over? Circle the correct answer.

    A   1.42 litres
    B   6.325 litres
    C   1.375 litres
    D   3.24 litres
    E   0.95 litres

9. Joan went on holiday for 7 days.
    On the fourth day of the holiday, she took 53 photos.
    On the fifth day she took 124 photos.
    On the sixth day she took 19 photos.
    On the seventh and final day she took as many
    photos as in the first 6 days put together.

    In total, Joan took 800 photos during her holiday.
    How many did she take during the first three days?

    Answer: _____

10. The first four patterns in a sequence are shown below.
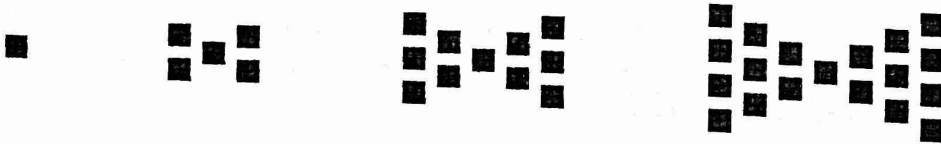
    How many squares will there be in the eighth pattern in the sequence?

    Answer: _____

    / 10

45

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. The parallelogram shown below is reflected in the mirror line.
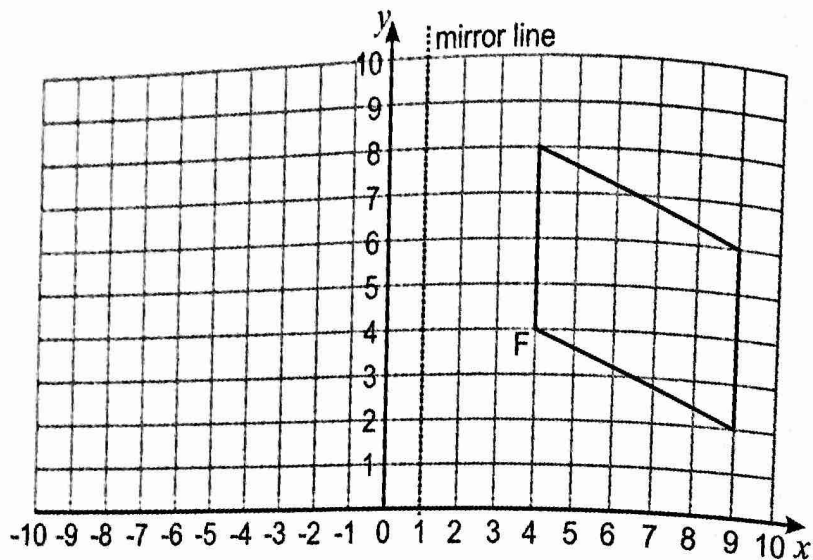
   What are the coordinates of the reflection of point F? Circle the correct answer.

   A (–7, 4)

   B (–4, 4)

   C (–2, 4)

   D (–4, –4)

   E (2, –4)

2. What number is 9 less than –13?

   Answer: _____

3. Seats have been put out in a school hall, ready for a concert.
   There are 9 rows of 11 seats and 10 rows of 12 seats.

   How many seats have been set out in total? Circle the correct answer.

   A 199   B 209   C 211   D 219   E 228

4. A group of 60 people went on a coach trip. For their lunch, they each had a choice of cheese or ham sandwiches and a choice of an apple or a banana. This table shows the number of people who chose each option.

	Cheese	Ham	Total
Apple		8	
Banana	15		
Total		28	60

How many people chose a cheese sandwich and an apple?
Circle the correct answer.

A   15   B   17   C   20   D   22   E   25

5. Josh is buying a fish tank for his four new tropical fish.

Which of the following would be the most sensible choice for the capacity of the fish tank? Circle the correct answer.

A   15 ml
B   150 ml
C   500 ml
D   150 000 ml
E   150 000 000 ml

6. The programmes shown on a TV channel over a 24-hour period were divided into seven categories. This pie chart shows the proportion of each type of programme.
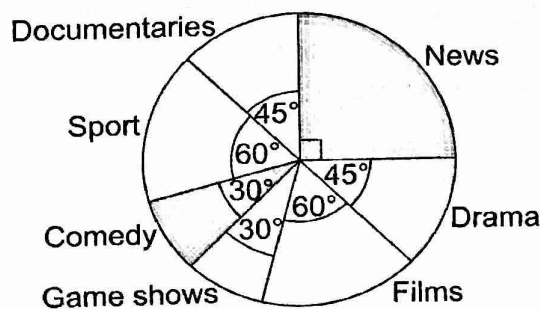
How many hours of sport were shown? Circle the correct answer.

A   4   B   5   C   6   D   7   E   8

7. For which of the following pairs of dice do both of the faces shown have the same number of lines of symmetry? Circle the correct answer.

A

B

C

D

E
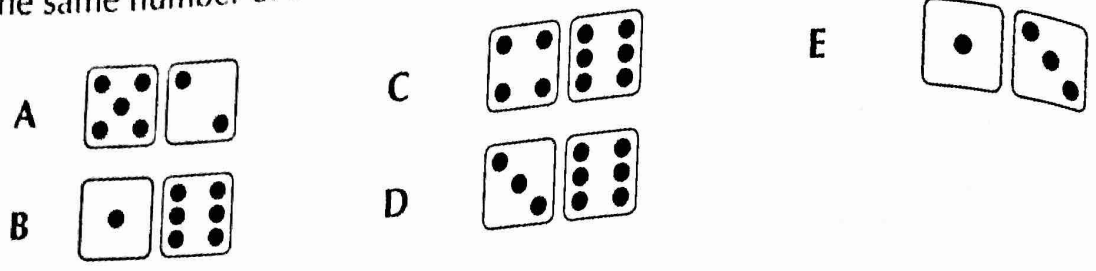
8. Joseph is thinking of a number. He says, "the number is a factor of 66, it is greater than 5, and it is prime".
What number is he thinking of?

Answer: _____

9. What is the area of this shape?
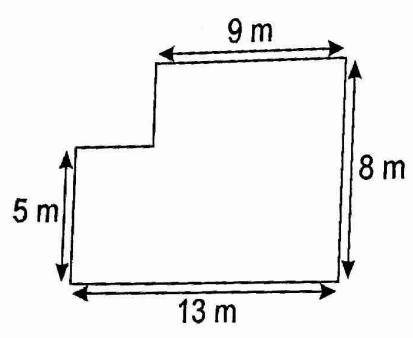
Answer: _____ m²

10. A pizza restaurant uses the formula $P = 5 + 0.4t$ to work out P, the price in pounds of a pizza where t is the number of toppings.
The chef creates a new recipe with 4 toppings.
What will be the price of this new pizza?

Answer: £ _____

/ 10

Time for a break! These puzzles are a great way to practise your maths skills.

Whose House?

The picture shows five houses on the same street.
Anna, Bex, Carrie, Don and Edgar each live in one of these houses.
Use the clues below to work out who lives in each house.

- Bex lives in a house with a prime number on either side.

- Anna lives in a house which is a multiple of 3.

- Edgar lives next door to Bex.

- Carrie lives next door to a house with a square number.

Number	Name
19	
21	
23	
25	
27	

Crazy Computer

Captain Calculator's Space Computer has developed a fault.

It has replaced the digits 0-9 with symbols.
Using the sums below, work out which symbol matches each digit.
Then find the code Captain Calculator needs to reset the computer.

$$\bullet \star - \bullet Y = \star$$
$$\star + \triangledown = \bullet Y$$
$$\bullet Y \div \because = \star$$
$$\bullet + \bullet = \star$$

$$I \times I = \blacktriangle I$$
$$\gtrless + \aleph = \bullet \bullet$$
$$\star \bullet \div \aleph = \blacktriangle$$
$$\because \times \gtrless = \star Y$$

Enter code $\square \gtrless Y \star$ to reset

$\because$ =		Y =		I =	
$\triangledown$ =		$\star$ =		$\square$ =	
$\bullet$ =	1	$\gtrless$ =			
$\blacktriangle$ =		$\aleph$ =			
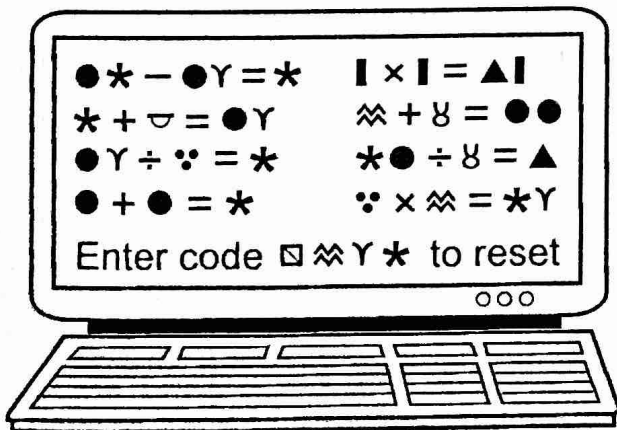
Code =				

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. Richard records the colours of all the cars he sees one day in a pie chart.
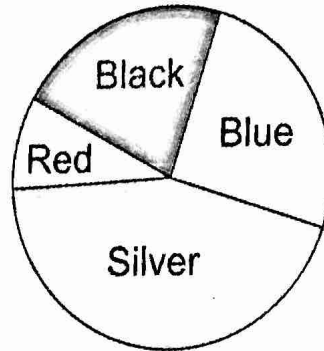
    What is the most common colour that Richard sees? Circle the correct option.

    A   Black

    B   Blue

    C   Silver

    D   Red

    E   Cannot tell

2. Chelsea has 1.5 kg of sugar. She divides it into equal piles that each weigh 75 g. How many piles of sugar can Chelsea make?

    Answer: _____

3. The ages of Mr Mann's six grandchildren are 11, 8, 4, 3, 3 and 1. What is the mean age of Mr Mann's grandchildren? Circle the correct option.

    A   30

    B   3

    C   5

    D   10

    E   3.5

4. What is the size of angle x? The diagram is not drawn accurately.

133° /x
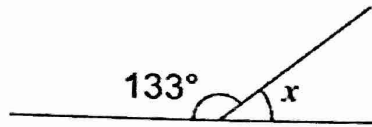
Answer: _____ °

5. What is 807 × 4096?

A   1 886 244
B   3 305 472
C   5 589 636
D   5 987 502
E   9 367 820

6. The diagram below shows the line S and the point T.
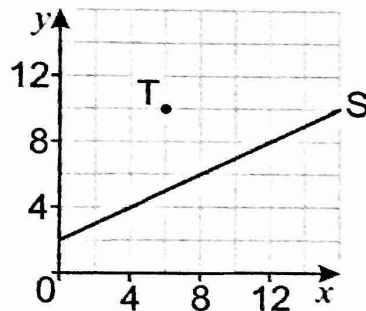
The line L is parallel to the line S and goes through the point T. What are the coordinates of the point where L meets the y-axis? Circle the correct option.

A   (3, 3)
B   (0, 7)
C   (11, 0)
D   (8, 6)
E   (0, 5)

7. Cally is thinking of a number. She doubles it, adds four and then doubles it again. She ends up with 44. What number did Cally start with?

Answer: _____

8. What is 15% of $\frac{1}{3}$ of 240? Circle the correct option.

    A   12
    B   24
    C   20
    D   40
    E   56

9. A rectangular garden has width x m. Its length is 5 m more than its width, and its area is 126 m². Which equation shows this information? Circle the correct option.

    A $x(x + 5) = 126$
    B $x + x + 5 = 126$
    C $2 \times (2x + 5) = 126$
    D $(x - 5)x = 126$
    E $x + 5 = 126$

10. John has a bag of 25 sweets, $\frac{1}{5}$ of which are cherry. He picks a cherry sweet out of the bag and eats it. What fraction of the remaining sweets are cherry? Circle the correct option.

    A $\frac{5}{24}$
    B $\frac{1}{4}$
    C $\frac{1}{6}$
    D $\frac{4}{25}$
    E $\frac{24}{25}$

/ 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. Which of the following is a hexagon? Circle the correct option.
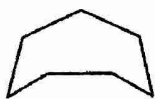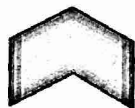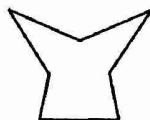
    A   B   C   D   E

2. The number of people who voted for the winner in a reality TV series was two hundred thousand, five hundred and three. What is this in figures?

    Answer: _____

3. Wayne and Linda work at a guitar shop. The number of guitars they each sold in one week is shown in a line graph.

Key
·········· Wayne
—— Linda
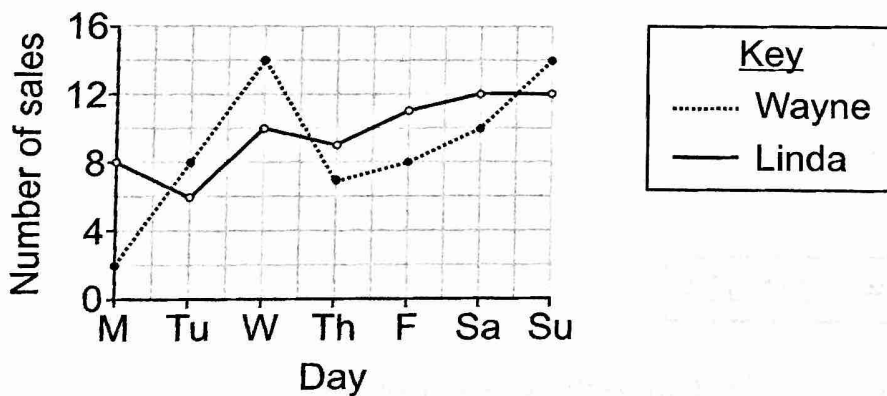
    What is the difference in the number of guitars sold by Wayne and Linda on Friday?

    Answer: _____

4. Circle the smallest value shown below.

   A   50%   B   0.45   C   ⁴/₁₀   D   ½   E   0.405

5. A sequence starts 1, 2, 4, 7, 11, ...
   What are the next two terms in the sequence? Circle the correct option.

   A   15 and 24
   B   16 and 22
   C   15 and 29
   D   22 and 40
   E   19 and 37

6.

6 cm

9 cm
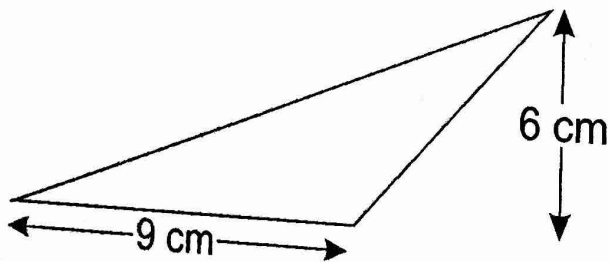
not drawn accurately

   What is the area of the triangle above? Circle the correct option.
   A   30 cm²
   B   36 cm²
   C   54 cm²
   D   27 cm²
   E   18 cm²

7. | 459 × 6626 = 3 041 334 |

   What is 45.9 × 66.26? Circle the correct option.
   A   3.041334
   B   30.41334
   C   304.1334
   D   3041.334
   E   30413.34

8. A shop sells 500 g bags of pasta for £1.60, and 1.5 kg bags of pasta for £3.60. Louise needs 3 kg of pasta for a buffet. How much money could she save by buying the 1.5 kg bags? Circle the correct option.

    A   £0.80

    B   £1.80

    C   £2.40

    D   £3.60

    E   £4.00

9. What does $6x + 3 + 2x - 8$ simplify to? Circle the correct option.

    A $9x + 5$

    B $4x + 5$

    C $8x - 5$

    D $5x - 2$

    E $8x + 5$

10. The sum of the angles in a polygon can be found using the expression $180(x - 2)$, where x is the number of sides of the shape.
What is the sum of the angles in an octagon? Circle the correct option.

    A   900°

    B   1440°

    C   1350°

    D   1080°

    E   1800°

/ 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. A banana costs 18p. Circle the number of bananas Connor can buy for £2.

    A 5   **B** 10   **C** 11   **D** 12   **E** 15

2. Which of the following is the most suitable unit for measuring the distance between two cities? Circle the correct answer.

    A km   **B** mm   **C** cm   **D** m   **E** m^2

3. The masses of Sarah's pets are listed below.

    23.5 kg, 8.11 kg, 200 g, 1.1 kg

    What is the difference, in kilograms, between her heaviest and lightest pets?

    Answer: _____ kg

4.

    — 19 cm —

    ? cm
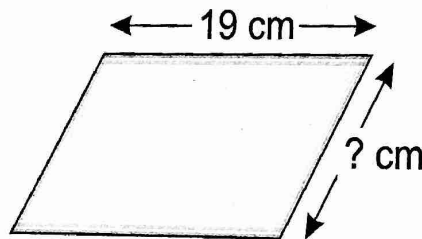
    not to scale
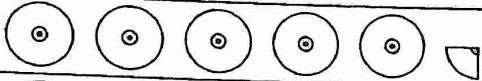
    The perimeter of the parallelogram is 62 cm.
    What is the length of the shorter side? Circle the correct option.

    A   17 cm

    B   15 cm

    C   12 cm

    D   9 cm

    E   6 cm

5. Nikki thinks of a number and divides it by 3. The remainder is 2.
   Which of these could have been her original number? Circle the correct answer.

   A   31

   B   60

   C   25

   D   23

   E   16

6. Andy records the number of CDs four of his teachers have in their CD collection.

Teacher	Number of CDs
Miss Elliot	
Mrs Robinson	
Miss Jackson	
Miss McKenzie	

 = ? CDs
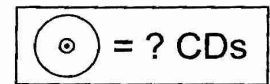
There are 34 CDs in Mrs Robinson's collection and Miss McKenzie's collection combined. What number should replace the '?' in the key?

Answer: _____

7. What is 7892.3216 rounded to the nearest thousandth? Circle the correct option.

   A   8000

   B   7900

   C   7892.322

   D   7892.321

   E   7892.32

8. On Monday, Miss Leigh marks 50 papers. Each day after that, she marks 5 fewer papers than the day before. How many papers does she mark from Monday to Friday? Circle the correct option.

    A   250

    B   225

    C   200

    D   175

    E   150

9. The three points on the coordinate grid are joined to each cross in turn to make five different shapes. How many irregular quadrilaterals are formed?
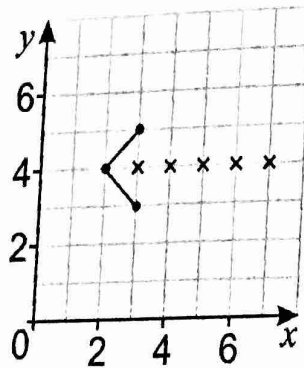
Answer: _____

10. A rectangular sports pitch needs its perimeter repainting.
Joanna can paint x m of the perimeter every minute.
The pitch is $2x$ m wide, and the length is twice the width.

How long does it take Joanna to paint the perimeter of the pitch?

Answer: _____ minutes

/ 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. How many factors of 30 are also factors of 15? Circle the correct option.

    A   0
    B   1
    C   2
    D   3
    E   4

2. What is the difference between the warmest and coldest temperatures shown below?

City	Temperature (°C)
Oslo	−9
Helsinki	−16
Paris	−1
Rome	11

Answer: _____ °C

3. Ellie completes a 400 m race in 80 seconds. It takes Amy 25% longer than Ellie to complete the race. How many seconds does it take Amy to complete the race?

Answer: _____ seconds

4. A rectangle has side lengths 4 m and 250 cm. What is its area in m²?

    A   1000 m²
    B   13 m²
    C   10 m²
    D   1.3 m²
    E   1 m²

5. There are approximately 35.274 ounces in 1 kg. There are approximately 6.35 kg in 1 stone. How many ounces are there in 1 stone? Circle the correct option.

    A   5.55

    B   176

    C   224

    D   0.18

    E   828

6. A group of people were asked to choose which type of holiday they would like to go on next, out of six different options. The results are given in a bar chart.
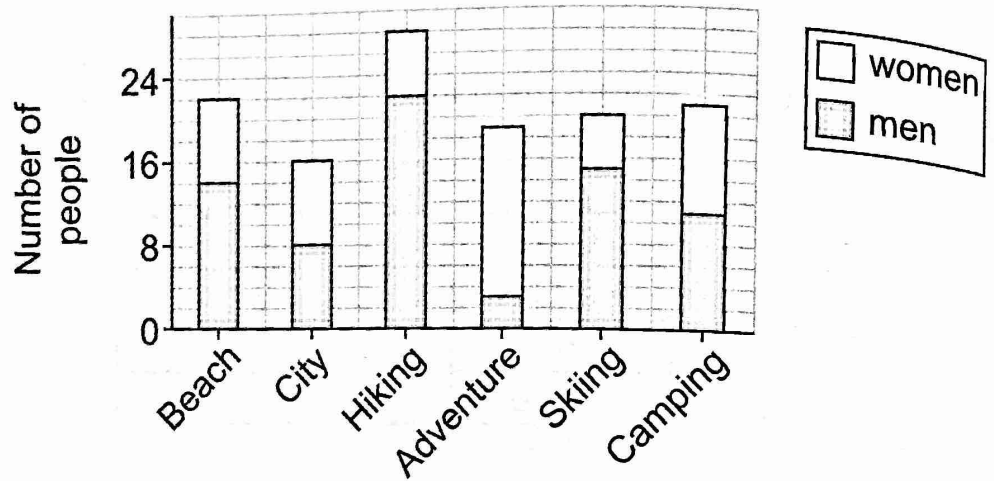
How many more men than women chose skiing?

Answer: _____

7. Which of the following shapes has the greatest number of lines of symmetry? Circle the correct option.

    A   Isosceles triangle

    B   Kite

    C   Scalene triangle

    D   Rectangle

    E   Equilateral triangle

© CGP   not to be photocopied

8. Four identical squares with side length 5 cm are put together to make a shape where each 'step' from one square to the next is 1 cm.

1 cm

not to scale
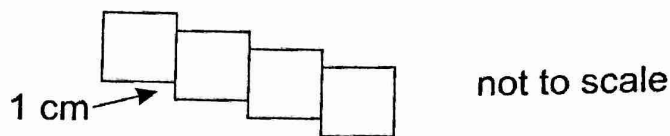
What is the perimeter of this shape?

A   56 cm

B   62 cm

C   80 cm

D   48 cm

E   52 cm

9.
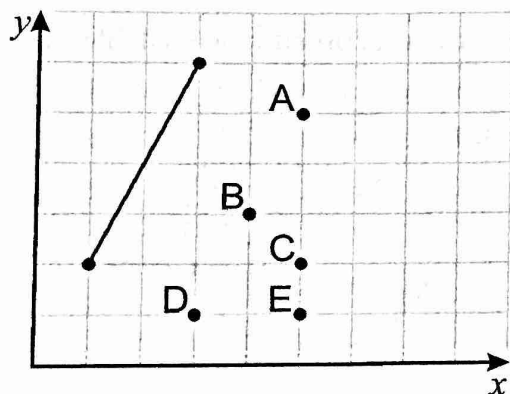
Which is the only labelled point that doesn't form a right-angled triangle or isosceles triangle when joined with the two end points of the line?

Answer: _____

10. In a sequence of dots, there are $\frac{1}{2}n(n + 1)$ dots in the nth pattern. What is the pattern number for the pattern made up of 28 dots? Circle the correct option.

A   5

B   7

C   11

D   15

E   16

/ 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. A new road is exactly 236 515 cm long. How long is the road in kilometres? Circle the correct option.

   A 0.236515 km

   B 2.36515 km

   C 23.6515 km

   D 236.515 km

   E 2365.15 km

2. The pie chart shows the favourite type of book of 60 people in a book club.
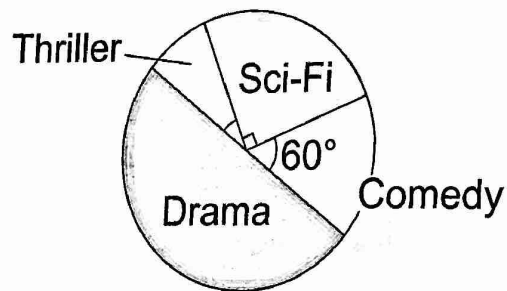
   How many people said that comedy was their favourite type?

   Answer: _____

3. Robert has a pile of identical equilateral triangle tiles. He places tiles next to each other to make different shapes, without the tiles overlapping.
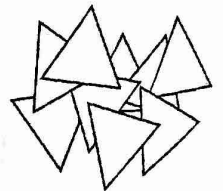
   Which of these shapes can he not make using the tiles? Circle the correct option.

   A Triangle

   B Rectangle

   C Parallelogram

   D Hexagon

   E Trapezium

4. The volume of a triangular prism is:

| area of triangular face × length |
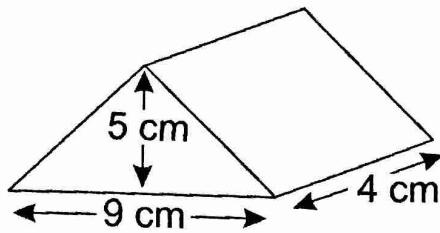
not to scale

What is the volume of the triangular prism above? Circle the correct option.

A   45 cm³

B   90 cm³

C   135 cm³

D   22.5 cm³

E   56 cm³

5. A cardboard box weighs 150 g. 24 bags of crisps, each weighing 30 g, are put into the box. What is the total weight of a box filled with 24 bags of crisps?

Answer: _____ g

6. The times of five runners who took part in a 200 m race are shown in the table.

Runner	Paula	Andrew	Mohammed	Jenni	Thomas
time (s)	29.89	47.82	46.95	31.59	28.94

What was the time difference between the fastest and slowest finishers?

Answer: _____ s

7. How many common multiples of 5 and 6 are there between 400 and 500? Circle the correct option.

A   0

B   1

C   2

D   3

E   4

8. The Number Cruncher uses a formula to turn one number into another.
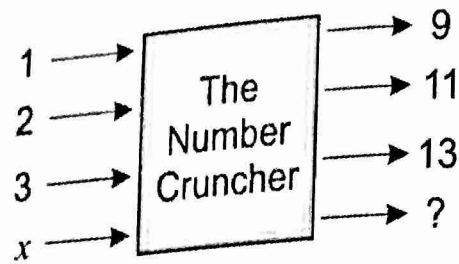
When you put x into The Number Cruncher, what comes out?
Circle the correct option.

A $9x$

B $x + 8$

C $2x + 7$

D $5x + 4$

E $5x + 1$

9. Gregory ploughs a field at a rate of 200 m² per minute. If he starts ploughing a 300 m × 400 m rectangular field at 9:00 am, what time will he finish? Circle the correct option.

A   1:00 pm

B   5:00 pm

C   7:00 pm

D   9:00 pm

E   11:00 pm

10. Keith makes a sequence where every term is greater than the previous term. To find a term, Keith multiplies the previous term by itself. Which of the following numbers could Keith have started with? Circle the correct option.

A   −1

B   0

C   0.5

D   1

E   2

Time for a break! These puzzles are a great way to practise your maths skills.

The Chess Tournament

The leaderboard in a chess tournament is shown here:

Some of the players are a bit fussy
about who they next play:

Emma says, "I'll only play against another girl."

Hayley says, "I won't play against anyone whose name begins with A."

Andrew says, "If I'm not playing against Mohammed, I'm not playing."

Two people next to each other on the leaderboard
can't play each other. Who is playing in the next game?

_____ against _____
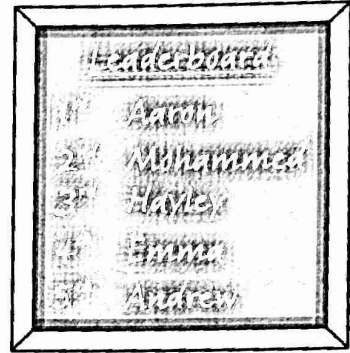
Pete's Pieces of Pizza

Pete has some pizzas and a pizza cutter that cuts in a straight line.
He makes one cut in Pizza 1, two cuts in Pizza 2, and so on.
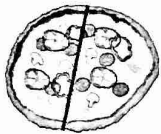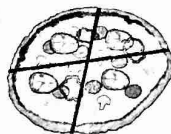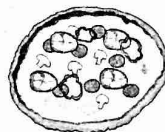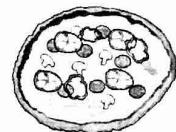
Pizza 1	Pizza 2	Pizza 3	Pizza 4
2 pieces	4 pieces	7 pieces	☐ pieces

Draw cuts onto Pizza 3 to give 7 pieces. (They don't have to be the same size.)
Fill in the box with the maximum number of pieces Pete can make from Pizza 4.

Is there a pattern in the number of pieces that Pete can make?
How many pieces can he make from Pizza 5 and Pizza 6?

Pizza 5 = ☐ pieces   Pizza 6 = ☐ pieces
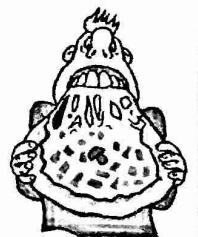
You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. An equilateral triangle has a side length of 4.5 mm. What is its perimeter?

   Answer: _____ mm

2. Circle the shape below which has a different number of lines of symmetry to the others.

   A   B   C   D   E
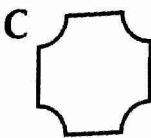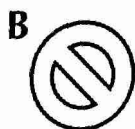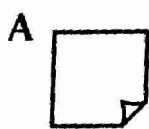
3. The bar chart below shows the numbers of apples and bananas sold in a grocer's over a period of five months.

   ⊞ Apples
   ☐ Bananas

   Jan   Feb   Mar   Apr   May
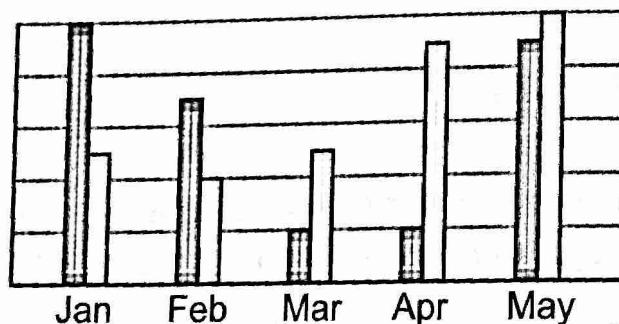
   Which month had the greatest difference between the number of apples and bananas sold? Circle the correct answer.

   A   January
   B   February
   C   March
   D   April
   E   May

4. What is $2140 \times 1.1 + 0.9 \times 2140$?

   Answer: _____

5. Athena is shopping for bargains at a car boot sale.
She buys four items from the table shown. She spends £14 in total.

| Tea Set | Hat | Phone | Glove | Book |
| £4.00 | £3.20 | £6.00 | £2.00 | £0.80 |
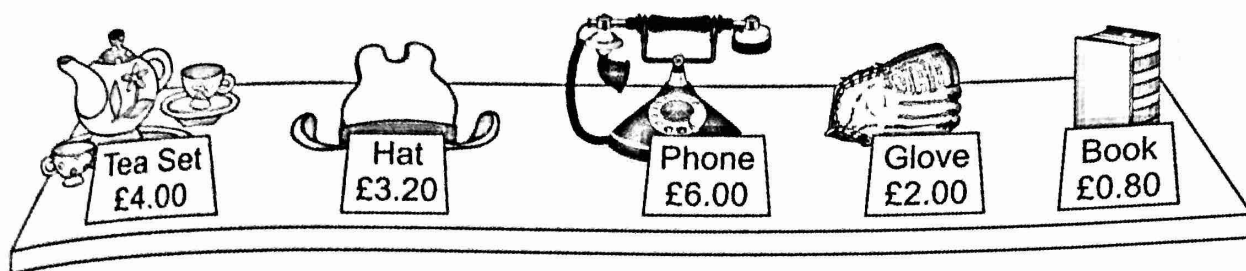
Which four items did she buy?

A Tea Set, Hat, Phone, Glove

B Hat, Phone, Glove, Book

C Tea Set, Phone, Glove, Book

D Tea Set, Hat, Phone, Book

E Tea Set, Hat, Glove, Book

6. The diagram shows the lines AB and PQ. AB is perpendicular to PQ.
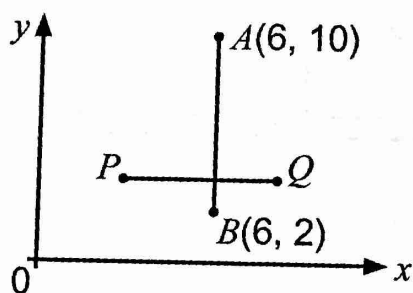
Which of these could be the coordinates of P and Q? Circle the correct answer.

A $P(3, 3)$ and $Q(8, 8)$

B $P(2, 4)$ and $Q(7, 2)$

C $P(3, 3)$ and $Q(8, 3)$

D $P(4, 2)$ and $Q(8, 4)$

E $P(3, 3)$ and $Q(7, 4)$

7. Siobhan starts at 50 and counts back in steps of 12.
Which of these numbers will she count? Circle the correct answer.

    A   0

    B   1

    C   2

    D   3

    E   4

8. The temperature in Nina's cellar is 8 °C at noon. The temperature in her cellar drops at a steady rate of 1 °C every 30 minutes over the course of the afternoon. What is the temperature in her cellar at 16:30?

Answer: _____ °C

9. Trevor has some square cards, all with the same side length.
He uses them to make the shape shown. Some of the cards are cut in half.
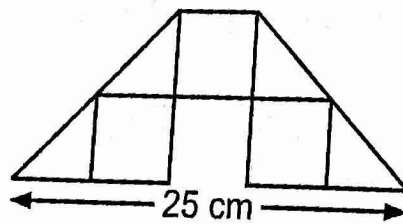
What is the area of his shape?

Answer: _____ cm²

10. There are 50 packets of crisps on a shelf. 10% are ready salted, $\frac{1}{5}$ are cheese and pickle, 10 are prawn cocktail, and the rest are roast chicken.
What is the most common crisp flavour on the shelf? Circle the correct answer.

    A   Ready salted

    B   Cheese and pickle

    C   Prawn cocktail

    D   Roast chicken

    E   Impossible to tell

/ 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. Jordi makes himself a cup of tea every hour. Sally makes herself a cup of tea every hour and a half. They both make a cup of tea at 09:00. Circle the time that they will next both make a cup of tea at the same time.

    A   11:00

    B   11:30

    C   12:00

    D   12:30

    E   13:00

2. A strip of patterned cloth costs 5p per centimetre.
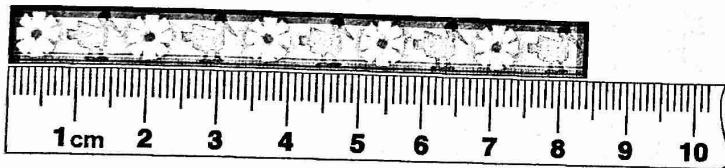
    How much does the strip of cloth shown cost? Circle the correct answer.

    A   £0.84

    B   £0.42

    C   £4.00

    D   £4.20

    E   £8.40

3. What number will correctly complete the following calculation?

$$38 + 38 + 38 + 38 = 8 \times \underline{\hspace{2cm}}$$

Answer: _____

4. A block of butter has mass 500 g and costs 99p. Tina buys 6 kg of butter. How much does this cost her? Circle the correct answer.

    A £11.88
    B £11.94
    C £11.99
    D £12.00
    E £12.60

5. Jasmine is on a fishing trip. The mean number of fish she catches each day over the first four days is 7. On the fifth day, she catches 2 fish. What is the mean number of fish she catches over the five days?

    Answer: _____

6. The graph shown converts Cumberland Pounds to Westmorland Dollars.
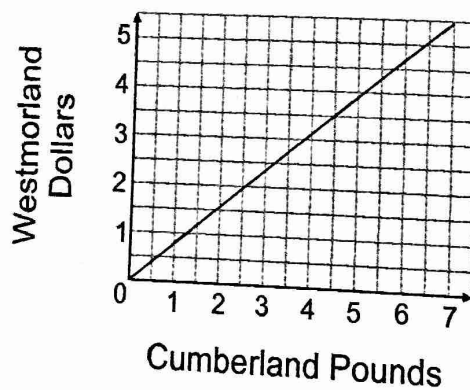
    Nadine converts 4.50 Cumberland Pounds into Westmorland Dollars. How many Westmorland Dollars does she receive? Circle the correct answer.

    A 2.50
    B 3.50
    C 3.25
    D 4.50
    E 5.75

7. Henry and Harriet have 67 racing pigeons between them. Harriet has 13 more than Henry. How many racing pigeons does Harriet have?

    Answer: _____

8. Look at the diagram shown below.
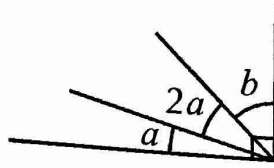
Circle the expression which correctly describes the angles shown.

A $a + b = 90°$

B $3a + b = 45°$

C $2a + b = 90°$

D $3a + b = 90°$

E $3a + b = 180°$

9. Zoe is carrying out a survey to find out what people's favourite take-away meal is. 40% of the people she asked said 'kebab'. She draws a pie chart to show the results of the survey. What size angle should she use for the 'kebab' sector?

Answer: _____ °

10. The diagram shows an L-shaped box.
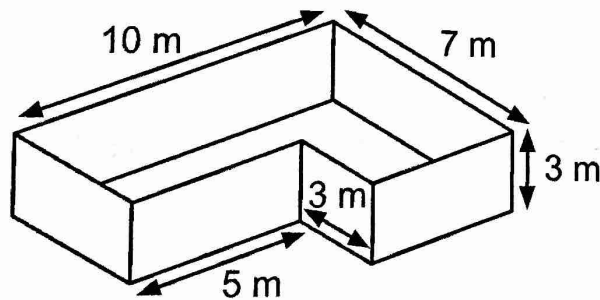
What is the volume of the box? Circle the correct answer.

A   165 m²

B   255 m²

C   215 m²

D   150 m²

E   195 m²

/ 10

Test 22

— not to be photocopied

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. The bar chart below shows the numbers of different types of vehicle parked at a service station car park.
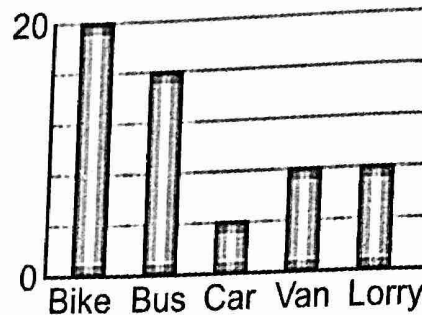
Which two types of vehicle had a combined total which was the same as the total for 'Bike'? Circle the correct answer.

A   Bus and Van

B   Car and Van

C   Bus and Car

D   Car and Lorry

E   Van and Lorry

2. Graeme pours some water into a 500 ml beaker, as shown.
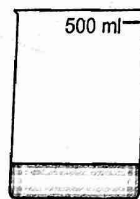
Circle the best estimate for the amount of water in the beaker.

A   100 ml

B   250 ml

C   5 ml

D   450 ml

E   1000 ml

3. Find the area of the shape shown.

10 mm

4 mm   22 mm   4 mm
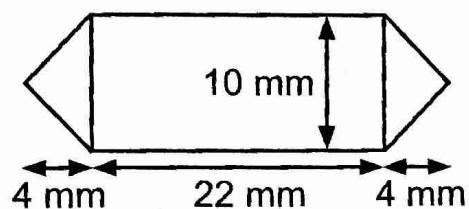
Answer: _____ mm²

4. Scott drove a total of 532 miles over a seven-day period.
What was the mean distance he drove each day during this period?

Answer: _____ miles

5. Donna is training for a marathon. Each week, she increases the distance she runs. In week 1, she runs 4 miles. In week 2, she runs 6 miles. In week 3, she runs 8 miles. She continues in this sequence.

In which week will Donna run 26 miles?

Answer: _____

6. Ronny has some rectangular tiles of size 8 cm × 3 cm and some equilateral triangle tiles of side length 6 cm. He arranges them to make the pattern shown.
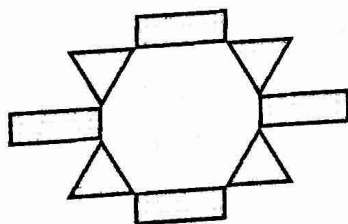
What is the perimeter of the octagonal hole at the centre of the shape?
Circle the correct answer.

A   46 cm   B   56 cm   C   30 cm   D   36 cm   E   48 cm

7. What fraction of all the faces on a fair six-sided dice show a number which is a factor of 10? Circle the correct answer.

    A $\frac{1}{6}$ **B** $\frac{1}{3}$ **C** $\frac{2}{3}$ **D** $\frac{5}{6}$ **E** $\frac{1}{2}$

8. A snail travels a distance of 0.5 cm every second. How long would it take the snail to travel 1 metre? Circle the correct option.

    A   1 minute
    B   1 minute 50 seconds
    C   2 minutes
    D   3 minutes 20 seconds
    E   5 minutes

9. A postman starts his deliveries at 4:20 am. He delivers to two houses per minute, and there are 200 houses on his route. If he has a 20 minute break during his round, what time will he finish? Circle the correct option.

    A   5:50 am
    B   6:20 am
    C   7:30 am
    D   8:10 am
    E   9:00 am

10. Kylie is mixing red and yellow paint to get the correct shade of tangerine. For every 0.75 litres of red paint, she uses 2.25 litres of yellow paint. She needs a total of 12 litres of paint to decorate her kitchen and bathroom. How many litres of red paint should she buy? Circle the correct answer.

    A   1.5 litres
    B   2 litres
    C   3 litres
    D   4.5 litres
    E   6 litres

/10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. The spinner shown is split into five different lettered sections.
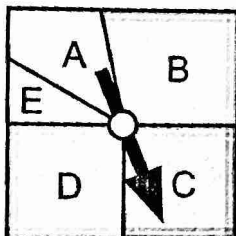
The pointer is turned 270° clockwise from its position shown in the diagram. Which letter is it now pointing to?

Answer: _____

2. Jimi is at an amusement arcade. He gets a £5 note changed into coins.
He receives five 50 pence pieces and ten 20 pence pieces.
The rest is made up of 10 pence pieces.
How many 10 pence pieces does he receive?

A   2

B   5

C   10

D   15

E   20

3. Theo set off from home at 10:53 and drove to his parents' house.
His journey took 2 hours and 42 minutes.
What time did he arrive at his parents' house? Circle the correct answer.

A   12:42

B   14:25

C   13:35

D   12:35

E   13:21

4. Darius is washing cars. He earns £3 for every car he washes.
The table shows the number of cars he washes during one week.

Day	Mon	Tue	Wed	Thu	Fri
Number of Cars	5	4	6	7	8

What was the mean amount he earned per day during this week?

Answer: £_____

5. The diagram shows a plastic box and a metal cube.

4 cm

3 cm

5 cm   3 cm
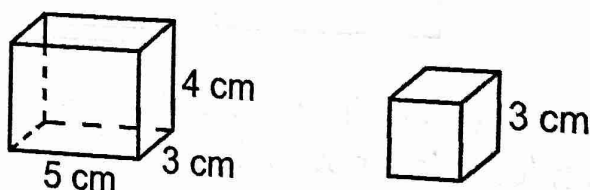
How many of the cubes will fit inside the box?

Answer: _____

6. Which of the following gives the smallest answer? Circle the correct option.

A   10% of 158

B   ½ of 30

C   0.1 × 100

D   ⅔ of 24

E   20% of 90

7. A poster sold at a museum is a copy of a painting, but at 75% the size of the original. If the poster is 60 cm wide, how wide is the original painting? Circle the correct option.

A   45 cm

B   50 cm

C   75 cm

D   80 cm

E   90 cm

8. Leo records the eye colour of all the members of his cycling club. He displays his results in the chart shown below.

Blue	Brown	Green

0%　　20%　　40%　　60%　　80%　　100%
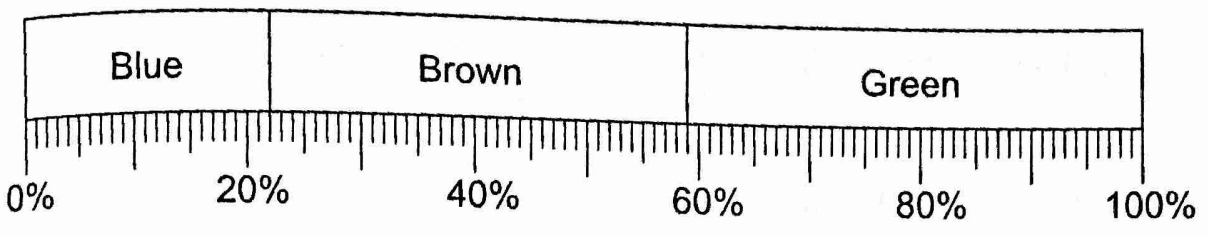
What percentage of his cycling club has brown eyes?

Answer: _____ %

9. David plots the points $A(-5, 5)$ and $B(5, -5)$ on a coordinate grid. He joins them up to form the diagonal line AB. AB passes through the origin $(0, 0)$. Circle the point below which is not on the line AB.

A　$(1, -1)$

B　$(-1, 1)$

C　$(2, 2)$

D　$(-2, 2)$

E　$(3, -3)$

10. The shape below is a parallelogram.
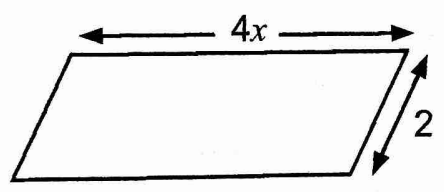
Circle the expression that gives the shape's perimeter.

A　$8x$

B　$4x + 2$

C　$8x + 2$

D　$8x + 4$

E　$6x$

/ 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. Look at the shape below.
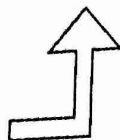
The shape is turned 90° anticlockwise. Circle the resulting shape.

A   **B**   **C**   **D**   **E**
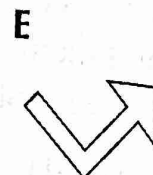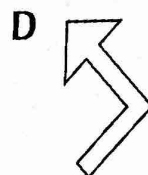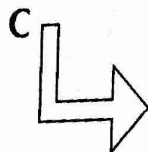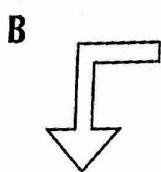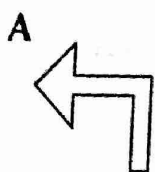
2. Steve creates a sequence using the rule 'multiply the previous number by 3, then subtract 2 from the result'. Circle Steve's sequence from the options below.

   A   1, 2, 4...
   B   2, 4, 10...
   C   2, 4, 8...
   D   3, 9, 27...
   E   3, 7, 18...

3. The price list for a barber's shop is shown below.

   ✂ GAVIN'S ✂
   Buzz Cut   £5.50
   Flat Top   £9.00
   Mohawk   £

   One weekend, Gavin does 10 buzz cuts, 5 flat tops and 4 mohawks.
   He earns £144. How much does Gavin charge for a mohawk?

   Answer: £_____

4. Two equilateral triangles each have a perimeter of 45 cm. Toby joins them together as shown, to create a rhombus.
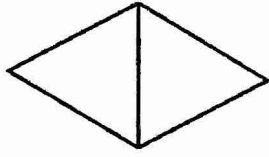
What is the perimeter of Toby's rhombus?

Answer: _____ cm

5. The graph shows the number of fish caught when using two different brands of fishing rod on a fishing trip.

Angler's Dream

Fish-o-matic

0   2   4   6   8   10   12   14
Number of Fish Caught
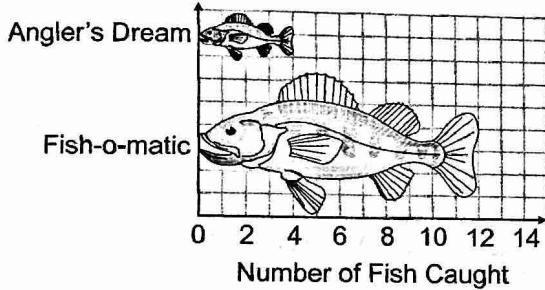
Why is the graph misleading? Circle the correct statement.

A   It is impossible to catch 12 fish in one day.

B   Not everyone likes fishing.

C   The area for Fish-o-matic is more than 3 times the area for Angler's Dream.

D   The horizontal axis values don't increase evenly.

E   Only two brands of rod were tested.

6. Rose is thinking of a number. Her number rounded to the nearest 10 is 1110. Circle the smallest number she could be thinking of.

A   1110

B   1100

C   1105

D   1115

E   1104

7. Rhoda is drawing a pictogram to show the number of eggs laid by her hens each month. She uses the key shown below.

 = 4 eggs
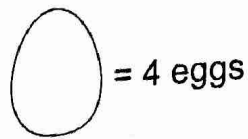
In January, her hens laid 35 eggs. How many egg pictures should she use in the pictogram for January? Circle the correct answer.

   A   10
   B   9
   C $8\frac{1}{2}$
   D $7\frac{1}{4}$
   E $8\frac{3}{4}$

8. Find the size of angle x, shown below.
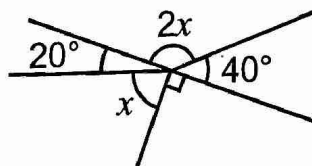
Answer: _____ °

9. Shirley is making a cottage pie. She usually uses 450 g of mince for 5 people. Today she is cooking for 8 people. How many grams of mince does she need?

Answer: _____ g

10. Gina has a collection of stamps. One fifth of all her stamps are from Britain, one third are from France, and one quarter are from Sweden.
Which of the following could be the number of stamps in Gina's collection? Circle the correct answer.

   A   50
   B   40
   C   30
   D   60
   E   20

/ 10

Puzzles 5
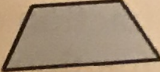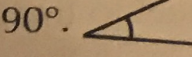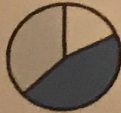
Maths Crossword
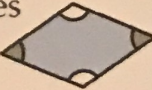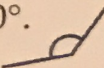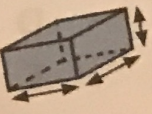
Use the clues given to complete the crossword.
One of the clues has been done for you.
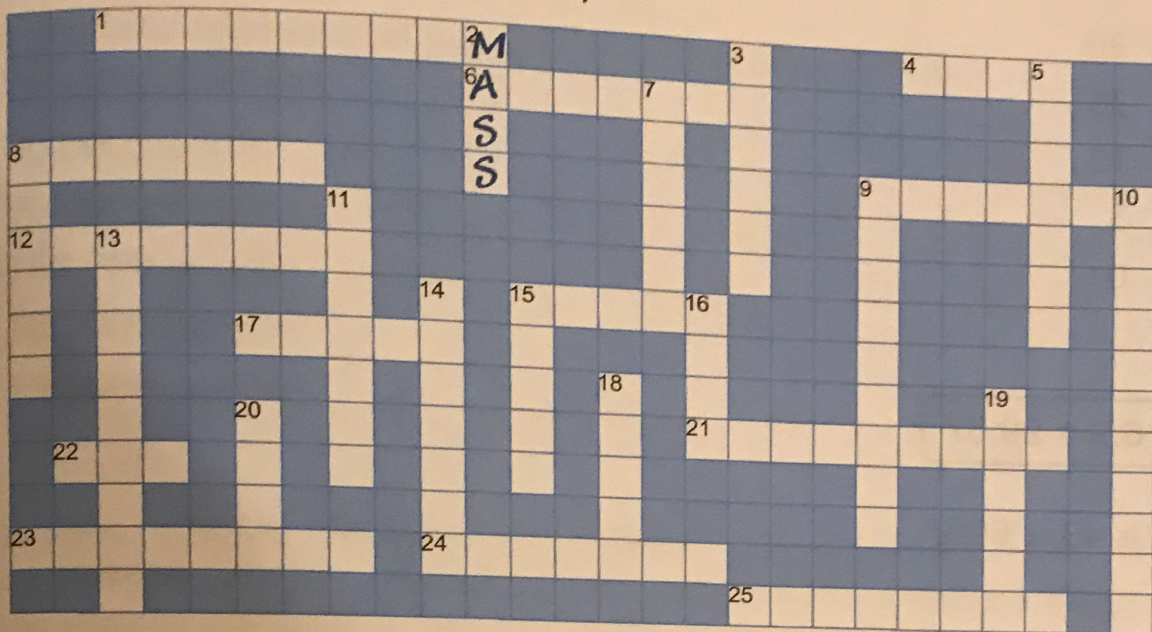
Across

1. A quadrilateral with one pair of parallel sides.
4. The number of sides in a quadrilateral.
6. Using letters to represent numbers. $2x + 1$
8. An eight-sided shape.
9. A 3D shape with triangular faces that meet at a point.
12. A three-sided shape.
15. A 3D shape with the same face at both ends.
17. An angle between 0° and 90°.
21. The top half of a fraction.
22. A 2D shape that folds to create a 3D shape.
23. A circular graph that shows the proportions of different values. (2 words)
24. A triangle with no equal sides or angles.
25. Two lines that will never meet.

Down

2. An amount measured in g or kg.
3. A number which divides exactly into another number.
5. A 2D shape with 4 equal sides and 2 pairs of parallel sides.
7. The order of operations.
8. An angle between 90° and 180°.
9. A chart that uses symbols.
10. The bottom half of a fraction.
11. A shape with sides of equal length and equal angles.
13. A triangle with two equal sides and two equal angles.
14. The units used to measure angles.
15. A number which only has itself and 1 as factors.
16. Average found by adding and dividing.
18. 100 cm.
19. The space in a 3D shape.
20. The space in a 2D shape.

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. A sequence begins 55, 45, 35, ... What is the fifth term in the sequence? Circle the correct option.

   A   30

   B   25

   C   15

   D   5

   E   0

2. | 4.3 × 6.9 = 29.67 |

   What is 43 × 690?

   Answer: _____

3. A fair spinner numbered 1-6 is spun. What fraction of the spinner is numbered with a factor of 12? Write your answer as a fraction in its simplest form.
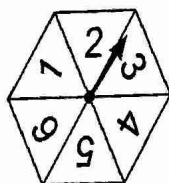
   Answer: _____

4. The distance from the centre of a bike wheel to the edge is 32 cm. What is the diameter of the bike wheel? Circle the correct option.

   A   32 cm

   B   48 cm

   C   56 cm

   D   64 cm

   E   16 cm

5. The graph below shows the population of the city of Balonia over time.
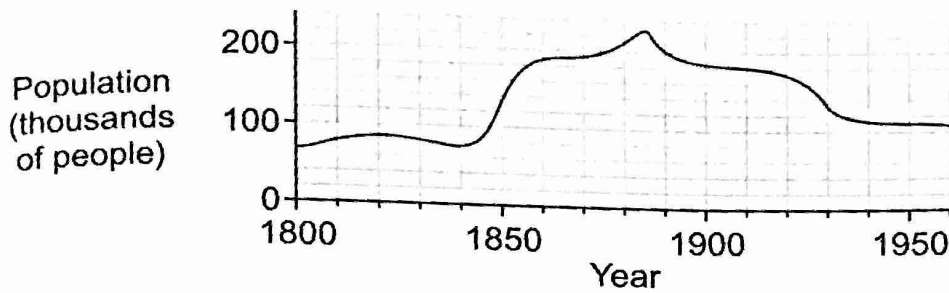
Use the graph to estimate the population of Balonia in 1910.
Circle the correct option.

A   80 000 people

B   90 000 people

C   160 000 people

D   180 000 people

E   190 000 people

6. A recipe says, "Cook a chicken for 25 minutes, plus 5 minutes for every 100 g it weighs." If Audrey has a chicken that weighs 1.1 kg, how long should she cook it for? Circle the correct option.

A   50 minutes

B   1 hour 10 minutes

C   1 hour 20 minutes

D   1 hour 50 minutes

E   2 hours 25 minutes

7. Tim makes a table. Each of the 4 legs has the dimensions 4 cm × 4 cm × 50 cm. The top is 20 cm × 20 cm × 1 cm. What is the volume of the material used to make the table? Circle the correct option.

A   3200 cm³

B   3600 cm³

C   4000 cm³

D   1800 cm³

E   1200 cm³

8. Ethan has an extra-long strawberry lace. He cuts it in half and gives one half to his big sister. He cuts the other half into three equal pieces and gives two of them to his little brother. He keeps the rest.

What fraction of the strawberry lace does Ethan keep? Circle the correct option.

A $\frac{1}{2}$

B $\frac{2}{6}$

C $\frac{1}{3}$

D $\frac{1}{6}$

E $\frac{2}{3}$

9. Mark has two identical triangles. Each triangle has sides with lengths 5 cm, 9 cm and 13 cm. He joins the shortest sides together to form a parallelogram. What is the perimeter of the parallelogram?

Answer: _____ cm

10. Mrs Biggs asked each pupil in her class how many siblings they have. She put the results in a bar chart.
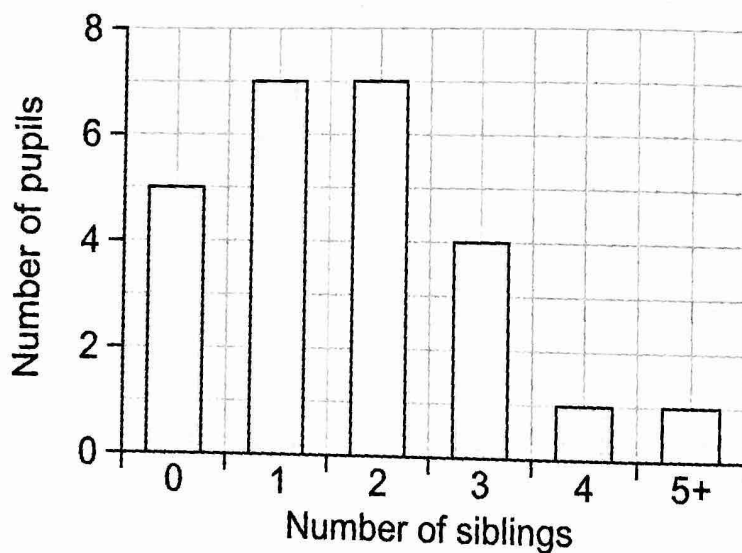
What percentage of the class have at least 5 siblings?

Answer: _____ %

/ 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. What percentage of the grid below has been shaded?

Answer: _____ %

2. Xan buys 5 bags of sweets. The number of sweets in each bag are listed here.

7, 6, 8, 8, 11

What is the mean number of sweets in a bag? Circle the correct option.

A   6
B   7
C   8
D   9
E   11

3. Barry, Mick and Alex were born in the same year.
Barry was born on 25th September, Mick was born on 12th June,
and Alex was born on 1st August.

How many days older than the youngest person is the oldest person?

Answer: _____ days

4. A group of people were asked whether they went on holiday last year. The results are shown in a pie chart.
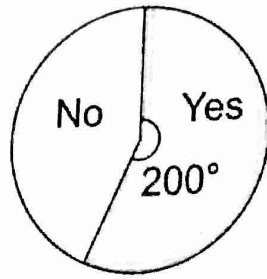
not drawn accurately

Sixteen people said that they did not go on holiday last year.
How many people said that they did? Circle the correct option.

    A   14
    B   17
    C   20
    D   26
    E   40

5. The total area of all the faces of a cube is 54 cm². What is the cube's side length?

Answer: _____ cm

6. One of the angles of a parallelogram is 111°.
What is the size of another of the angles that isn't 111°?

Answer: _____ °

7. On a coordinate grid, a counter is placed at the point with coordinates (–4, 5). The counter is moved two squares to the right, then diagonally across one square. Which of these points is the counter definitely not at? Circle the correct option.

    A   (–1, 6)
    B   (–3, 4)
    C   (–3, 6)
    D   (–2, 6)
    E   (–1, 4)

8. Four identical regular octagons are placed together to make the shape below.
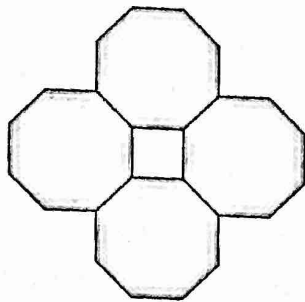
The square formed in the middle has a perimeter of 20 cm. What is the outer perimeter of the shape? Circle the correct option.

A   84 cm

B   95 cm

C   100 cm

D   116 cm

E   125 cm

9. What is $8 \times 41 + 6 \times 82$?

Answer: _____

10. A type of plant pot can stack neatly, as shown below.

‡ 3 cm

8 cm
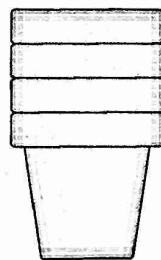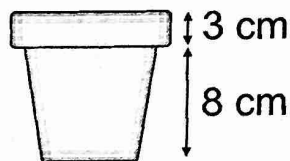
What is the height, in cm, of a stack of x pots? Circle the correct option.

A $11x$

B $3x + 8$

C $8x + 3$

D $8 + 3 + x$

E $5x$

/ 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1.

Fruit Shop	
Apple	15p
Pineapple	95p

Joan buys a pineapple and three apples. How much does she spend?
Circle the correct option.

A £1.85   **B** £1.60   **C** £1.40   **D** £1.45   **E** £1.70

2.   Circle the shape below which has the greatest number of lines of symmetry.

A   **B**   **C**   **D**   **E**
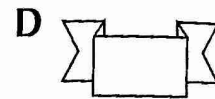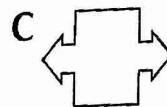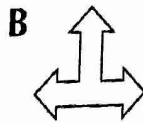
3.   Look at the scales shown below.
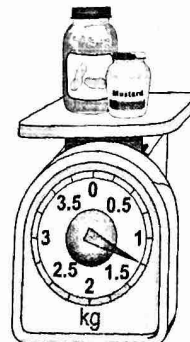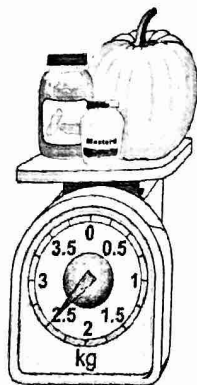
What is the mass of the pumpkin?

Answer: _____ kg

4. A cuboid has length 14 m, width 2 m and volume 280 m³.
What is the cuboid's height? Circle the correct answer.

A 5 m   B 2 m   C 10 m   D 20 m   E 100 m

5. Pam is sorting pencils into pencil pots. Each pot can hold 9 pencils.
She fills each pencil pot before moving on to the next one.
She has 111 pencils in total.
How many pencils will she put in the last pencil pot?

Answer: _____

6. The chart below shows the total number of goals scored by all the teams in the first
five rounds of an ice hockey tournament. The vertical axis has been left blank.

Number of Goals

1   2   3   4   5
Tournament Round
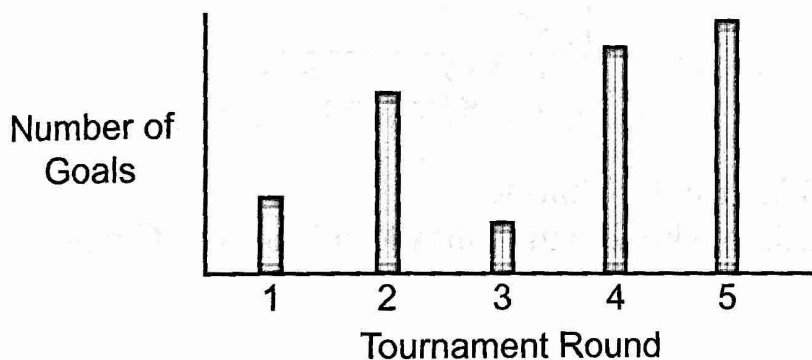
Which of these sets of data could show the number of goals
scored in those five games? Circle the correct answer.

A 28, 71, 21, 84, 96
B 24, 68, 40, 90, 99
C 30, 11, 19, 77, 88
D 90, 51, 10, 66, 89
E 12, 24, 10, 35, 30

7. A crystal glass costs £17.50. A set of 4 glasses costs £56.
What is the saving you would make by buying a set, instead of
4 individual glasses? Write your answer as a percentage.

Answer: _____ %

Test 28

8. A stalactite increases in length at a rate of 2 mm per year. Circle the number of years it will take to increase from a length of 20 cm to a length of 29 cm.

   A   4.5 years

   B   45 years

   C   450 years

   D   4500 years

   E   45 000 years

9. Ken has drawn the graph below to help him convert between miles and kilometres.
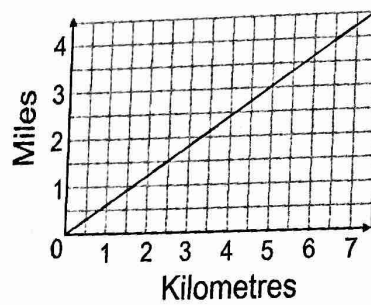
   He completes a 25 km run for charity.
   Use the graph to estimate how many miles Ken has run. Circle the correct answer.

   A   25 miles

   B   50 miles

   C   20 miles

   D   15 miles

   E   5 miles

10. Circle the expression below which is not equivalent to the others.

   A $12x \div 2$

   B $4x + 2$

   C $6x$

   D $3x \times 2$

   E $7x - x$

/ 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. Sean checks his gas meter reading. The meter reading is shown below.

2 8 9 7 8 3

He checks the reading again six months later. It has increased by 842.
What is the new meter reading?

Answer: _____

2. Two angles add up to make a right angle. One of them is 83°.
What is the other angle? Circle the correct answer.

A   17°

B   27°

C   7°

D   97°

E   107°

3. A recipe uses 100 g of flour, 100 g of sugar and 80 g of butter.
Damian has 120 g of butter, and wants to use it all in this recipe.
What total weight of flour and sugar should he use?
Circle the correct answer.

A   200 g

B   120 g

C   240 g

D   300 g

E   400 g

4. The diagram below shows the point A with coordinates $(-5, 4)$.
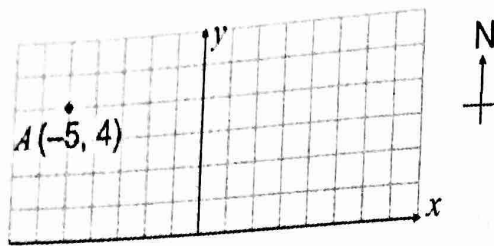
The point A is translated 8 squares east and 4 squares south.
What are the new coordinates of A? Circle the correct answer.

    A $(8, 4)$

    B $(0, 3)$

    C $(3, 0)$

    D $(-1, -4)$

    E $(4, 8)$

5. Althea is thinking of a number. She says, 'the number is a factor of 60, a multiple of 5, and 1 less than a square number'.
Which of these is the number she is thinking of? Circle the correct answer.

    A   10

    B   3

    C   35

    D   48

    E   15

6. A cup holds 256 ml of water and a bathtub holds 189.4 litres of water. How many cups could you fill from the water in a full bathtub? Circle the correct option.

    A   739

    B   625

    C   1165

    D   1373

    E   341

Circle the statement below which is incorrect.

A   2% is equivalent to 0.02

B   0.25 is equivalent to $^1/_4$

C $^4/_{10}$ is equivalent to 40%

D $^3/_5$ is equivalent to 0.6

E   35% is equivalent to 3.5

8. The first six terms in a sequence are 1, 4, 9, 16, 25 and 36.
What is the eleventh term in the sequence?

Answer: _____

9. Elise and Lara have a total of 120 trading cards between them.
Elise has three times as many as Lara. How many does Elise have?

Answer: _____

10. Sheryl cuts a triangle from a rectangular piece of card, as shown.
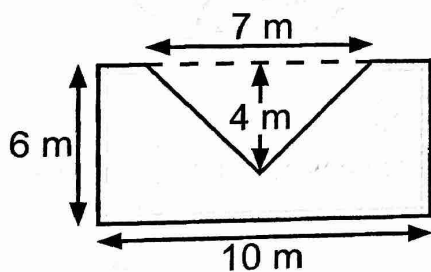
What is the area of the shape left over? Circle the correct answer.

A   60 m²

B   54 m²

C   44 m²

D   46 m²

E   32 m²

/ 10

Test 29

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. What is $7980 \div 3.8$? Circle the correct answer.

   A   2.1

   B   21

   C   210

   D   2100

   E   21 000

2. Liam asks his art class to name their favourite equipment to work with.
   He records the results in the pie chart shown.
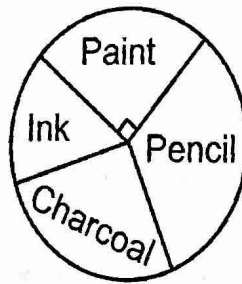
   There are 28 people in his art class.
   How many people said that paint was their favourite?

   Answer: _____

3. Jamie sets off from home at 13:30. He drives for 25 minutes, stops at a service
   station for 10 minutes, and then drives for a further hour and a half before arriving
   at his destination. What time does he arrive? Circle the correct answer.

   A   14:05

   B   15:35

   C   15:25

   D   15:05

   E   14:50

The shape shown below is made out of seven cubes.
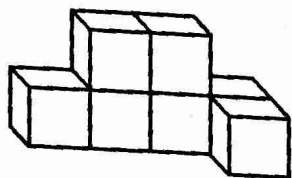
Circle the option below which shows the view when looking down from directly above the shape.

A **B** **C** **D** **E**
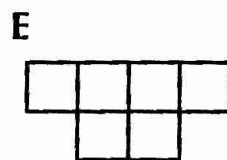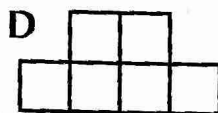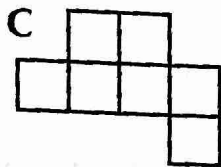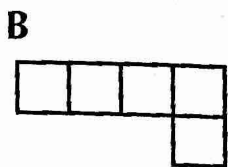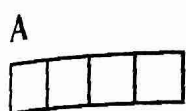
Aiden has 3 stripy ties, 5 spotty ties and 12 plain ties.
What fraction of all his ties aren't spotty? Circle the correct answer.

A $^{3}/_{20}$

B $^{17}/_{20}$

C $^{3}/_{4}$

D $^{1}/_{4}$

E $^{3}/_{5}$

The shape shown is reflected in the dotted mirror line.
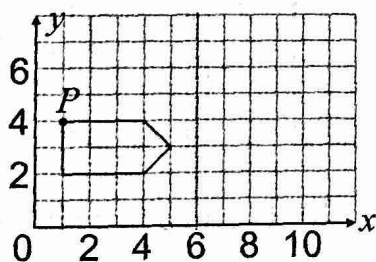
What is the new position of vertex *P*? Circle the correct answer.

A (1, 4)

B (4, 1)

C (11, 4)

D (12, 4)

E (10, 4)

7. Sebastian cycles a total of 120 miles over a period of 5 days.
    What is the mean distance he cycles each day?

    Answer: _____ mile

8. A sheet of card has a thickness of 0.5 mm. Diego piles these sheets
    to a height of 8 cm. How many sheets of card are in his pile?

    Answer: _____

9. The formula for finding the nth term in a sequence is $10 - 4n$.
    What is the third term in the sequence? Circle the correct answer.

    A   7
    B   −33
    C   3
    D   −2
    E   −4

10. The shape below is made by cutting a rectangle from a larger rectangle.
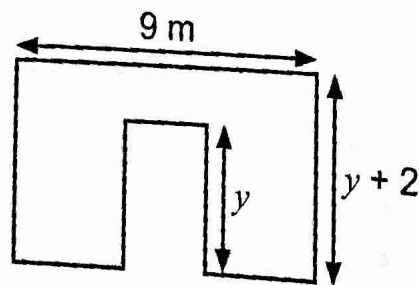
    Circle the expression below which gives the shape's perimeter.

    A $20 + 4y$
    B $11 + 2y$
    C $22 + 4y$
    D $20 + y$
    E $20 + 2y$

    / 10

You have **10 minutes** to do this test. Work as quickly and accurately as you can.

1. Yasmine sells 120324 copies of her new novel in its first week. What is this figure in words? Circle the correct answer.

   A   one hundred and twenty three thousand and twenty four

   B   twelve thousand, three hundred and twenty four

   C   one hundred and twenty thousand, three hundred and twenty four

   D   one million, two hundred thousand, three hundred and twenty four

   E   one hundred and twenty million, three hundred and twenty four thousand

2. Which of the angles below is obtuse? Circle the correct answer.
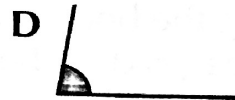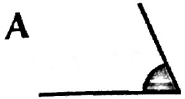
3. Marissa is painting a wooden gate. The surface of the gate has an area of 12 m². She buys a tin of paint which will cover an area of 48 m². What fraction of the tin of paint is left over when she has finished? Circle the correct answer.

   A $\frac{1}{5}$

   B $\frac{1}{4}$

   C $\frac{3}{5}$

   D $\frac{3}{4}$

   E $\frac{1}{2}$

Madison's bookshelf contains 200 books. 22% of her books are horror stories, 37% are sci-fi stories, and the rest are non-fiction. How many of her books are non-fiction?

Answer: _____

5. The diagram below shows an isosceles triangle.
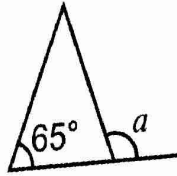
What is the size of angle *a*? Circle the correct answer.

    A   65°

    B   165°

    C   115°

    D   125°

    E   135°

6. George is reading a book which has 860 pages.
    He reads at an average rate of two pages per minute.
    Since starting the book, he has read for 1 hour and 20 minutes.
    How many pages does he still have left to read? Circle the correct answer.

    A   800

    B   700

    C   790

    D   650

    E   760

7. The pictogram below shows the amount of time Henry
    spent playing different sports during one week.

Football   Basketball   Tennis   Baseball

Key:
1 ball = 60 minutes
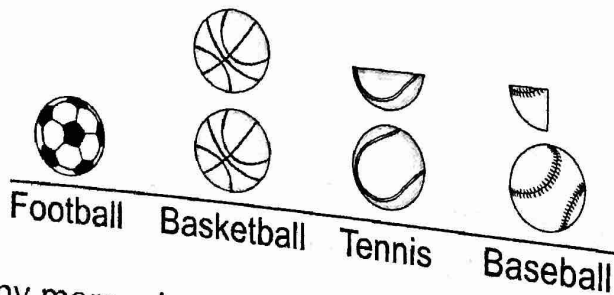
How many more minutes did Henry spend playing
basketball than baseball during this week?

Answer: _____ minutes

The table below shows the number of pairs of different kinds of footwear in Reuben's wardrobe.

Type	Number of pairs
Smart shoes	2
Boots	5
Trainers	8
Slippers	1

What fraction of his footwear collection is made up of either boots or slippers? Circle the correct answer.

A $^1/_{16}$

B $^1/_4$

C $^1/_2$

D $^3/_8$

E $^5/_{16}$

Malcolm thinks of five numbers. He writes four of them down:

13, 7, 9, 16

He says, 'the mean of the five numbers is 12'.
What is the fifth number Malcolm was thinking of?

Answer: _____

0. $x^2 > 2 \times 25 - 1$

x is a positive whole number. What is the smallest number that x could be?

Answer: _____

/ 10

Test 31

Time for a break! These puzzles are a great way to practise your maths skills.

Equal Shapes

Split each shape on the right in half to make two identical smaller shapes.
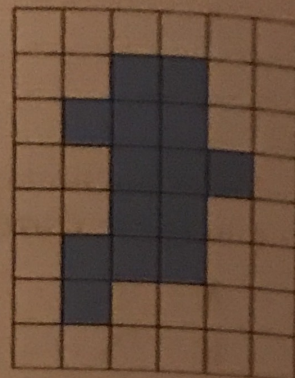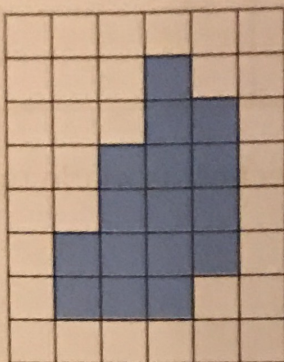
Elevenses

Amelia writes down a trick to find out if a number will divide exactly by 11. She uses the trick to show that 3091 divides exactly by 11:

1. Add together all the digits in the even positions:

   3091   0 + 1 = 1

2. Add together all the digits in the odd positions:

   3091   3 + 9 = 12

3. Subtract the smaller sum from the larger sum:

   12 − 1 = 11

4. If the result is 0 or a multiple of 11, then the number divides exactly by 11. ✔

Use Amelia's trick to answer the following:

- Does 29 524 divide exactly by 11?
- Does 312 581 divide exactly by 11?
- What is the only number between 2 165 860 and 2 165 869 that divides exactly by 11?

Test 1 — pages 2-4

1.   279 000

The number in the hundreds column is 6, which is greater than five, so you round the thousands up. This gives 279 000.

2.   16

Lisa reads 9 pages on Saturday and 7 on Sunday. So on the weekend Lisa reads 9 + 7 = 16 pages.

3.   B

The cube measures 5 cm × 5 cm × 5 cm. So its volume is 5 × 5 × 5 = 125 cm³.

4.   A

Half of 5 litres is 5 ÷ 2 = 2.5 litres, which is equal to 2500 ml. Subtracting 1600 ml from this gives 2500 - 1600. Using partitioning, 1600 breaks into 1000 + 600. 2500 - 1000 = 1500, and 1500 - 600 = 900, so she has 900 ml left.

5.   C

Find the mean by adding up the lengths and dividing by the number of pencils. The 3 longest pencils are 14 cm, 13 cm and 9 cm. The total length of these is 14 + 13 + 9 = 36 cm. So the mean is 36 cm ÷ 3 = 12 cm.

6.   8.1 m

There are 100 cm in 1 metre, so 350 cm = 3.5 m. To find the distance, add the depth to the height — 3.5 + 4.6. 4.6 breaks down into 4 + 0.6. 3.5 + 4 = 7.5, and 7.5 + 0.6 = 8.1. So it's 8.1 m.

7.   D

376 = 188 × 2. So 64 × 376 = 64 × 188 × 2. You know that 64 × 188 = 12 032, so double this: 12 032 × 2 = 24 064.

8.   B

The terms in the sequence will all be odd, because you're adding 1 to a multiple of 4 (which is even). 45 218 is even, so cannot appear in this sequence.

9.   B

Jane adds 5 to x to give x + 5. She then multiplies this by 7, to give 7(x + 5). So B is correct. (Remember that multiplication comes before addition in BODMAS, so you need the brackets.)

10.   C

a + b will always be bigger than c, otherwise the sides a and b won't be long enough to make a triangle. So option A is always true. Option B could be true. b can't be greater than a + c for the same reason that option A is true. So option C is definitely not true. Two lengths added together will always be greater than 0, so D is true. E could be true.

Test 2 — pages 5-7

1.   D

None of the options have the 6 to the right of the decimal point. So you're looking for the option where the 6 is closest to the decimal point (or where the decimal point would be), which is D.

2.   A

The angles in a triangle add up to 180°. It is a right-angled triangle, so one of the angles is 90°. So the missing angle is 180° - 72° - 90° = 18°.

3.   1200 ml

This is an extra 6 people, which is an extra half of the amount in the recipe. The recipe needs 800 ml tomato sauce, so Tony needs an extra half of this: 800 ÷ 2 = 400 ml. Adding this on gives 800 + 400 = 1200 ml.

4.   B

A prime number only divides exactly by 1 and itself. So the only prime number which is a multiple of 5 is 5. Any other multiple of 5 won't be prime, as it will divide by 1, itself and also 5.

5.   E

25% of the film is 35 minutes. 100% of the film is four times this: 35 × 4 = 140 minutes. There are 60 mins in an hour, so 140 mins = 2 hours 20 mins.

6.   A

There are twice as many red balls as blue balls. So for every blue ball, there are 2 red balls, and so out of every 3 balls, 1 is blue. So the fraction of the balls that are blue is ¹/₃.

7.   A

The total height of the stack is 240 cm. The height of 2 boxes is 2 × 15 cm = 30 cm, and 240 ÷ 30 = 24 ÷ 3 = 8, so there are 8 lots of 2 boxes, which is 16 boxes in total. Each box has mass 0.2 kg, so the total mass of the stack is 16 × 0.2. 16 × 2 = 32, so 16 × 0.2 = 3.2. The total mass is 3.2 kg.

8.   4

The horizontal sides add up to give two lots of 50 m, and the vertical sides add up to give two lots of 30 m. So the perimeter is (2 × 50) + (2 × 30) = 100 + 60 = 160 m. 3 × 160 = 480, so James needs to do 1 more lap to have run over 500 m. So he needs to run 4 laps.

9.   C

4(x + 5) = 44 means that 4 multiplied by a number gives 44. 4 × 11 = 44, so the bit in the brackets is equal to 11. If x + 5 = 11, then x = 6.

10.   B

Rachel has more, so you can rule out options D and E. In pounds, Rachel has about £0.50 more. In dollars, she has about $0.80 more. So the answer is option B.
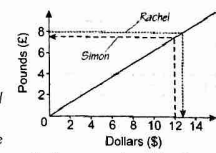
Test 3 — pages 8-10

1.   (9, 4)

Moving 7 squares to the right gives an x coordinate of 9. Moving 2 squares down gives a y coordinate of 4. So the coordinates are (9, 4).

2.   9

In the 'Piccalilli' row there are 3¹/₂ squares. So there were 3¹/₂ × 4 = 14 piccalilli sandwiches sold (you can work this out using partitioning). In the 'BLT' row there are 1¹/₄ squares, so there were 1¹/₄ × 4 = 5 BLT sandwiches sold. The difference is 14 - 5 = 9.

3.   C

4% = 0.04, ³/₁₀₀ = 0.03 and ¹/₂₀ = ⁵/₁₀₀ = 0.05. Option B has a 6 in the tenths column so it's bigger than the other four options, which all have a 0 in the tenths column. 0.03 has the smallest number in the hundredths column, so ³/₁₀₀ is the smallest.

4.   B

There are 1000 g in 1 kg, so 16.2 kg = 16 200 g. To find the mass of just the sand, subtract the mass of the bucket. 850 breaks down into 800 + 50. 16 200 - 800 = 15 400. 15 400 - 50 = 15 350. So the sand has a mass of 15 350 g.

5.   D

The cube has side length 2 cm, so on the net, one face has area 2 × 2 = 4 cm². There are six identical faces on a cube, so the total area is 4 × 6 = 24 cm².

6.   E

Mrs Rogers has 4 + 3 + 1 = 8 stickers in total. Four of them are square. As a fraction, this is ⁴/₈, which is the same as ¹/₂.

7.   2:55 pm

Four hours before 7:15 pm is 3:15 pm. 20 minutes before 3:15 pm is 2:55 pm.

8.   B

Angles in a quadrilateral add up to 360°. Find the sum of the angles given: 49° + 31° = 80°. And 216° + 80° = 296°. So the missing angle is 360° - 296° = 64°.

9.   4949

Both parts of the calculation are multiplied by 49. So you've got '138 lots of 49' minus '37 lots of 49', which gives 138 - 37 = 101 lots of 49, or 101 × 49. 49 × 100 = 4900, and 49 × 1 = 49. So 49 × 101 = 4900 + 49 = 4949.

10.   E

The sequence of the perimeters of the shapes goes: 4, 6, 8, 10, ... So you're adding two each time. So the first part of the expression is 2n. In Shape 1, you need to add 2 to get 4, so the expression is 2n + 2.

Test 4 — pages 11-13

1.   43 °C

The difference between -25 °C and 0 °C is 25 °C, and the difference between 0 °C and 18 °C is 18 °C. So the difference between -25 °C and 18 °C is 25 + 18 = 43 °C.

2.   B

The only factors of 27 are 1, 3, 9 and 27. 3 is also a factor of 48, and 9 is not, so the answer is option B.

3.   B

The angles in a quadrilateral add up to 360°. 47 + 133 + 95 = 275° (use the column method). Subtracting this from 360 gives 360 - 275 = 85°.

4.   36 cm²

This is made of a rectangle and a triangle. The rectangle has area 3 × 10 = 30 cm². The base of the triangle is 10 - 7 = 3 cm, so its area is ¹/₂ × 3 × 4 = ¹/₂ × 12 = 6 cm². So the total area is 30 + 6 = 36 cm².

5.   B

Use estimation — round 14.68 kg to 15 kg and round 1024 to 1000. So one full shipping container weighs about 15 × 1000 = 15 000 kg. Five containers weigh 15 000 × 5 = 75 000 kg. Option B is the only option close to 75 000 kg, so the answer is 75 161.6 kg.

6.   E

10 nails cost 5p, so 50 nails cost 5 × 5p = 25p. A hammer costs £2.50, so the total cost is £2.50 + 25p = £2.75. So his change is £10 − £2.75 = £7.25.

7.   C

Add together all the heights of the plants and divide by the number of plants. 19 + 25 + 28 + 32 = 104 cm. 104 ÷ 4 = 26 cm. (You can use partitioning here.)

8.   B

The scale starts at 15, not 0. So the difference between each day looks bigger than it actually is.

9.   D

3(x + 2) means (x + 2) + (x + 2) + (x + 2), which is the same as 3x + 6. So 3(x + 2) − 1 = 3x + 6 − 1 = 3x + 5.

10.   C

There are 3 × 5 = 15 hats to start with. After a blue hat and a green hat are given away, there are 15 − 2 = 13 hats. No red hats have been given out, so there are still 5. As a fraction, this is $^5/_{13}$.

Test 5 — pages 14-16

1.   B

Round each number to the nearest thousand — so the sum becomes 67 000 + 10 000 + 1000 = 78 000. The only number close to that value is 77 785.28.

2.   D

10% of 60 is 60 ÷ 10 = 6. 5% is half of 10%, so 5% of 60 is 6 ÷ 2 = 3. So 15% = 10% + 5% = 6 + 3 = 9.

3.   3 hours, 0 minutes

Mel has stopped when the graph is flat. The first time was between hours 2 and 3, so she stopped for 1 hour. The second time was between hours 5 and 6.5, so she stopped for 1.5 hours. The third time was between hours 8 and 8.5 so she stopped for 0.5 hours. Adding these together gives 1 + 1.5 + 0.5 = 3 hours.

4.   11

6 litres = 6000 ml. 1 pint is 568 ml, so 10 pints is 10 × 568 = 5680 ml. This isn't quite enough. Adding on one more pint gives over 6000 ml, so the smallest number of 1 pint cartons that you need to buy is 11.

5.   D

A is false because 16 × 30 = 8 × 60 < 8 × 800. B is false because 15 × 30 = 30 × 15. C is false because 20 × 25 = 10 × 50 > 10 × 12.5. E is false because 45 × 1000 = 450 × 100 < 900 × 100. D is true as 18 = 9 × 2, and 48 = 2 × 24, so you can write the equation as 9 × 2 × 24 = 9 × 2 × 24.

6.   C

The space in the middle of Shape 2 is 6 times bigger than the space in the middle of Shape 1 (you can split it into 6 triangles). So multiply 8 by 6: 8 × 6 = 48 cm².

7.   14

Add up all the test scores and divide by the number of scores. 6 + 19 + 20 + 11 = 56. 56 ÷ 4 = 14.

8.   E

Angles on a straight line add up to 180°. 180° − 44° = 136°, so 3x + x = 136°, and so 4x = 136°. To find x, divide 136 by 4: 136 ÷ 4 = 34°.

9.   112

Other than 2 and 5, all prime numbers end in 1, 3, 7 or 9. So look at 51, 53, 57 and 59. 51 and 57 both divide by three so they are not prime. The question says there are two prime numbers in this range. So the only prime numbers between 50 and 60 are 53 and 59. Add them together to give 53 + 59 = 112.

10.   B

The angle for 4 is 180°, the angle for 2 is 90° and the angle for 6 is 30°. So the angle in total for even numbers is 180 + 90 + 30 = 300°. So the angles for odd numbers are 360 − 300 = 60°. The dice is rolled 36 times, so each roll is represented by 360 ÷ 36 = 10°. So 60° represents 60 ÷ 10 = 6 rolls.

Puzzles 1 — page 17

Moon, Star, Diamond, Circle

☽ = 9
★ = 4
◆ = 5
⬤ = 1

Larry's Test

If the difference between the highest and lowest mark is 70, then Larry's score must be either 28 + 70 = 98 or 93 − 70 = 23. If the most common mark is 88, then Larry's score must be 88. If the mean is 55, then the total for all six tests must be 55 × 6 = 330. The other scores add up to 329, so Larry's score must be 1.

Test 6 — pages 18-20

1.   B

Subtracting £635 from £990 gives a profit of £355. You can use partitioning or the column method here.

2.   £45

Using the special offer, you can buy 10 plants and get the other 10 free. This would cost £4.50 × 10 = £45.

3.   B

There are 2 triangles out of a total of 6 shapes. As a fraction, this is $^2/_8$, which simplifies to $^1/_3$.

4.   B

23 ÷ 5 = 4 remainder 3, so $^{23}/_5 = 4^3/_5$. Now turn the fraction part into a decimal. Multiplying the top and bottom of $^3/_5$ by 2 gives $^6/_{10}$. This is equivalent to 0.6, so $^{23}/_5 = 4^3/_5 = 4.6$.

5.   D

The three angles in a triangle add up to 180°. Add up the two angles you know, and subtract the total from 180°. 51° + 72° = 123°. 180° − 123° = 57°.

6.   800 m²

The platform is a 50 m × 20 m rectangle with a 20 m × 10 m rectangle removed. 50 × 20 = 1000 (it's just 5 × 2 with two zeros on the end.) 20 × 10 = 200, so the platform's area is: 1000 − 200 = 800 m².

7.   D

The total number of newspapers was 15 + 15 + 16 + 14 + 10 + 30 + 40. You can break this addition into chunks: 15 + 15 = 30, 16 + 14 = 30, 10 + 30 = 40. So the total is 30 + 30 + 40 + 40 = 60 + 80 = 140. There are 7 days, so the mean is 140 ÷ 7 = 20.

8.   D

The time that she was sitting on the bench is shown by the straight horizontal line. The time that she set off back home is the point that the horizontal line ends — this was 75 minutes after she initially set off. 75 = 60 + 15, so this is 1 hour and 15 mins. She set off at 09:00, and 1 hour 15 mins after this is 10:15.

9.   53

The difference between the terms increases by 1 each time. So first you subtract 2, then you subtract 3, then you subtract 4 and so on... So the fifth term is 64 − 5 = 59, and the sixth term is 59 − 6 = 53.

10.   B

He starts with a total of S + S = 2S sweets and gives away 30. So the number left is 2S − 30.

Test 7 — pages 21-23

1.   B

A heptagon has 7 sides, so the perimeter is 120 × 7. 12 × 7 = 84, so 120 × 7 = 840 mm.

2.   D

x is greater than a right angle (90°), but less than a straight line (180°), so it's either A or D. x looks like it's closer to 180° than 90°, so the best estimate is 150°.

3.   C

1 km = 1000 m, so 740 m = 0.74 km and 120 m is 0.12 km. So the total distance he walks is 0.74 + 2.5 + 0.12 = 3.36 km (use the column method here).

4.   18

Reverse the operations. 96 ÷ 8 = 12. 12 + 6 = 18.

5.   £10.50

10% of £70 = £70 ÷ 10 = £7. 5% is half of this, which is £3.50. So 15% is £7 + £3.50 = £10.50.

6.   300 m³

The container has total volume 10 × 15 × 6 = 10 × 90 = 900 m³ (use partitioning or write out the calculation if you need). $^1/_3$ of this is 900 ÷ 3 = 300 m³.

7.   16

The 'Tuna' sector is 45°, which is half of 90°. The 'Trout' sector is half a circle, which is twice 90°. So the 'Trout' sector is four times bigger than the 'Tuna' sector. Four people said that tuna was their favourite, so 4 × 4 = 16 people said that trout was their favourite.

8.   D

Put n = 5 into the formula: 20 − (4 × 5) = 20 − 20 = 0.

9.   E

A is false because half of 29 is 14.5, which isn't a whole number of conkers. B is false because if Callum had collected half as many as Simone, then he would have 1 conker for every 2 of Simone's. So the total would be exactly divisible by 1 + 2 = 3, but it is not. C and D are false because an even number plus an even number and an odd number plus an odd number both give an even number, but 29 is odd. E could be true because Callum could have collected 15 and Simone could have collected 14, which would give a total of 29.

10.   B

The total number of people asked was 2 + 3 + 9 + 10 + 7 + 4 = 35. 10 people picked the ball marked 'D'. As a fraction, this is $^{10}/_{35}$. Dividing the numerator and denominator by 5 simplifies this to $^2/_7$.

Test 8 — pages 24-26

1.   13 700

You're rounding the 9. The number to the right of this is 5, so you round up to 13 700.

2. C
Depth is a distance, so it can't be ml or m³ (which measure volume), or m² (which measures area). Most wells are a lot deeper than a few mm — they are usually several metres deep. So the most suitable unit is m.

3. D
The total number of cheese sandwiches sold was 80 – 35 = 45. 12 of these were on white bread, so the number of cheese on brown bread was 45 – 12 = 33.

4. 23
Divide 161 by 7. 161 breaks into 140 + 21. 140 ÷ 7 = 20 and 21 ÷ 7 = 3, so 161 ÷ 7 = 20 + 3 = 23.

5. B
After the reflection, the shape looks like this →
It has 6 sides, so it's a hexagon.

6. 30
¼ of a circle represents 20 ÷ 4 = 5 albums, so Jeff has 20 + 5 = 25 in total. ¾ of a circle represents 3 × 5 = 15 albums, so Noel has 20 + 20 + 15 = 55 in total. So Noel has 55 – 25 = 30 more than Jeff.

7. D
For each pair, find the difference between each number and 16.5 by subtracting. The correct answer is D: 16.5 – 15.9 = 0.6, and 17.1 – 16.5 = 0.6.

8. C
All the points are inside the shape, except for point C, shown on the right.
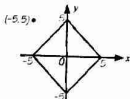
9. 129°
The angles in the triangle are 51°, 90° and 180° – 90° – 51° = 39°. So a is 90° + 39° = 129°.

10. E
There is a flat rate of £4, so the expression will be "4 + something". There is a charge of 80p per mile — in pounds, this is 0.80, or 0.8. For d miles, this will cost 0.8 × d, or 0.8d. So the total cost is 4 + 0.8d.

Test 9 — pages 27-29

1. 106 minutes
The bus leaves Poolton at 11:32. 09:46 and arrives in Vansdell at 11:32. 09:46 to 10:00 is 14 mins. 10:00 to 11:00 is 60 mins, and 11:00 to 11:32 is 32 mins. So the total time is 14 + 60 + 32 = 106 minutes.

2. C
If you compare it to the other shapes, you can see that C has one block missing (from the 'base' of the shape).

3. A
Writing the value in figures gives 3025 ml.
1 litre = 1000 ml, so 3025 ml = 3.025 litres.

4. 72 kg
45 ÷ 5 = 9, so 9 kg of hay feeds one horse for one day. 9 × 8 = 72, so 72 kg would feed 8 horses for one day.

5. 4
The factors of 30 are 1, 2, 3, 5, 6, 10, 15, 30. Out of these, 3, 6, 15 and 30 are multiples of 3. So he circles 4 values.

6. B
Tim and Sue each won 4 games and Kym won 2 games. Adding these together gives 4 + 4 + 2 = 10 games, which is the number of games that Ice won.

7. 107°
The sum of the angles in the pie chart is 360°. The sum of the angles you're given is 78 + 77 + 48 + 50 = 253. So the missing angle is 360° – 253° = 107°.

8. £7.10
Kevin spends £1.40 + £1.50 = £2.90 on his ingredients. He sells ten cakes for £1 each, so he makes £1 × 10 = £10. So his profit is £10 – £2.90. You can use the partitioning method here: £10 – £2 = £8 and £8 – £0.90 = £7.10.

9. C
A square has 4 equal sides, so it will have sides of 48 ÷ 4 = 12 m. So the area is 12 m × 12 m = 144 m².

10. E
He starts with x, then divides by 2, giving x ÷ 2. Then he subtracts 15, giving x ÷ 2 – 15. Finally, he multiplies by 8, giving 8(x ÷ 2 – 15).

Test 10 — pages 30-32

1. B
Use rounding. 52.45 to the nearest 10 is 50, and 8.98 to the nearest 10 is 10. 50 × 10 = 500. The closest option is 471.001, so the correct answer is B.

2. 89p
37 breaks down into 30 + 7. 30 × 3 = 90 and 7 × 3 = 21, so 37p × 3 = 90p + 21p = 111p. So his change is 200p – 111p = 89p.

3. B
The most common response is the sector with the biggest angle in the pie chart. This is 80°, so the most common response was 2.

4. 10 m
The horizontal lengths add up to give two lots of 3.5 m. The vertical lengths add up to give two lots of 1.5 m. The perimeter is 1.5 + 1.5 + 3.5 + 3.5 = 3 + 7 = 10 m.

5. 117°
Angles in a quadrilateral add up to 360°. 81 breaks down into 80 + 1. 3 × 80 = 240 and 3 × 1 = 3. So 3 × 81° = 240° + 3° = 243°. The remaining angle is 360° – 243° = 117°.

6. 16
The number of dots in each term is 1, 4, 7, 10... So it increases by 3 each time. In the 5th term, there will be 10 + 3 = 13, and in the 6th there will be 13 + 3 = 16.

7. E
All the times have 1 in the tens column, so compare the units. Tabby has the lowest units value (4), so she came first. Dinah, Pam, Debbie and Moirah all have 5 in the units column, so compare their tenths columns. Debbie has the lowest tenths value (1), so came second. Pam has the next lowest (2), so came third.

8. 50 s
The highest point on the graph is halfway between 40 s and 60 s on the time axis. This is 50 seconds.

9. E
The only card which doesn't have any lines of symmetry is the one with the letter 'R'. There are 10 cards in total, and 9 of them have at least one line of symmetry. As a fraction, this is ⁹/₁₀.

10. D
There is a one-off cost of £150, so the expression will be "150 + something". Then there is a cost of £60 per day. For n days, this will cost 60 × n, or 60n. So the total cost is 150 + 60n.

Puzzles 2 — page 33

Blackboard Blues
Adding a vertical line to the minus sign will turn it into a plus sign: 10 + 5 = 15
Adding a horizontal line to the second 1 in 111 will turn it into a plus sign: 1 + 1 + 1 = 3
Adding a horizontal line before the 2 will turn it into a negative: 1 – 3 = –2
Adding a horizontal line to the 1 will turn it into a 7: 7 + 7 = 14
Adding a diagonal line to one of the + signs will turn it into a 4: 545 + 5 = 550

Drawing Straws
It takes 2 moves to create 4 equilateral triangles:

It takes 2 moves to create 2 equilateral triangles:
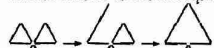
It takes 6 moves to create 1 equilateral triangle:
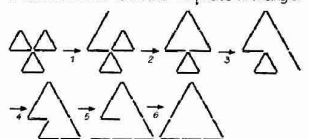
Test 11 — pages 34-36

1. C
There are ten steps from 1.2 to 1.3. 1.3 – 1.2 = 0.1, so each step is worth 0.1 ÷ 10 = 0.01. To get to 1.24, count on 4 steps from 1.2. This brings you to C.

2. C
If Craig turns 90° anticlockwise, he will be facing west, and will see the Ferris wheel.
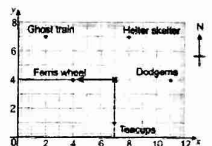
3. £5.20
4 bags cost 4 × £1.20 = £4.80 (use partitioning if you need). So her change is £10 – £4.80 = £5.20.

4. A
The angles at opposite corners of a parallelogram are equal, so angle P = 68°.

5. D

The 3D appearance of the pie chart means that the 'vanilla section looks bigger than the others, because you can see more of the side of that section.

6. 6.3 litres

Becky buys 10 × 330 ml = 3300 ml of lemonade. 1 litre = 1000 ml, so 3300 ml = 3.3 litres. She also buys 2 × 1.5 = 3 litres of cola. In total, this is 3.3 + 3 = 6.3 litres.

7. 4350

The total number of tickets sold is 1289 + 1455 + 1606 = 4350 (use the column method here).

8. C

The net is for a cube of side length 10 cm, so each of the faces is a 10 cm × 10 cm square. The sheet of cardboard has a length equal to 4 squares and a width equal to 3. So the cardboard measures 40 cm by 30 cm — its area is 40 cm × 30 cm = 1200 cm².

9. D

The mean of the 5 numbers is 180. So the sum of the 5 numbers is 5 × 180. 180 breaks into 100 + 80. 5 × 100 = 500 and 5 × 80 = 400, so 5 × 180 = 900. 155 + 162 + 190 + 198 = 705 (use the column method). The missing number is 900 – 705 = 195.

10. E

Alice is A years old, and Barney's age is twice this. So Barney is 2A years old. Charlene is 4 years younger than Barney, so her age is 2A – 4. You're told that Charlene is 16, so 2A – 4 = 16 is the correct equation.

Test 12 — pages 37-39

1. 734.14

15.62 is 100 times smaller than 1562, so 15.62 × 47 is 100 times smaller than 1562 × 47. This is 73414 ÷ 100 = 734.14

2. C

Subtract the 2.89 m from 5.76 m:
$$\begin{array}{r} {}^{4}5.{}^{6}7{}^{1}6 \\ -\ 2.89 \\ \hline 2.87 \end{array}$$

3. 3.25 kg

1000 g = 1 kg, so 1550 g = 1.55 kg. 1.55 + 1.7 = 3.25 kg (use partitioning or the column method).

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4. A

Cecilia ate ⁵/₁₂ of the sandwiches. There were 12 sandwiches, so ¹/₁₂ is 1 sandwich. So Cecilia ate 5. Paul ate ¹/₄ of the sandwiches. ¹/₄ of 12 = 12 ÷ 4 = 3, so Paul ate 3. Art ate the rest, which is 12 – 5 – 3 = 4.

5. 42 cm

The perimeter of Shape 1 is 5 times the side length of each tile. So the side length of each tile is 30 cm ÷ 5 = 6 cm. The perimeter of Shape 2 is 7 times the side length of the triangular tiles. This is 7 × 6 cm = 42 cm.

6. C

There are two lines of symmetry — 1 horizontal and 1 vertical.

7. C

10% of £18 is £18 ÷ 10 = £1.80. So the sale price is £18 – £1.80 = £16.20.

8. D

The number of people is 6000 ÷ 750. You can simplify this division by cancelling down the two numbers, like simplifying a fraction. 6000 ÷ 750 = 600 ÷ 75 (divide by 10) = 200 ÷ 25 (divide by 3). 100 ÷ 25 = 4, so 200 ÷ 25 = 8.

9. 58

The differences between the first five numbers in the sequence are: 2, 4, 6, 8. The difference increases by 2 each time, so the sixth number will be 80 – 10 = 70 and the seventh number will be 70 – 12 = 58.

10. D

The points on the graph for each week show the total raised by the end of that week. So the total raised during the fourth week is the difference between the total at the end of week 4 and the total at the end of week 3. The graph shows that the amount raised by the end of week 3 was £1200 and the amount raised by the end of week 4 was £2100. So the amount raised during week 4 was £2100 – £1200 = £900.

Test 13 — pages 40-42

1. 7

From the chart, 13 people said 'Ape' and 6 people said 'Duck'. So the difference is 13 – 6 = 7.

2. C

You're looking for the next longest after 18.25 m. Abigail's and Zora's distance are both longer than this, so you want the longest distances out of Alexei, Li and Dina. This is Li's distance of 18.04 m.

---

3. 13

6 × 12 = 72, so 12 boxes wouldn't be enough. One more box would let her hold a total of 72 + 6 = 78 eggs, which would be enough. So she needs 13.

4. (3, 8)

A rhombus always has lines of symmetry through opposite corners. So K must be the same horizontal distance from (8, 5) and (8, 11) as (13, 8). 13 – 8 = 5, so the x coordinate of K is 8 – 5 = 3. K must be the same vertical distance from (8, 5) and (8, 11) as (13, 8), so its y coordinate must also be 8.

5. D

1 m = 100 cm, so 5.5 m = 550 cm. So the length left over will be 550 – 75 = 475 cm. This is 4.75 m.

6. 63 cm²

You can split the whole logo up into smaller squares, as shown. There are 7 smaller squares, each of area 9 cm², so the total area of the logo is 7 × 9 = 63 cm².

7. B

The perimeter is the total distance Jenny walked, 2650 m. Take away 2 × the length:
2650 m – 850 m – 850 m = 1800 m – 850 m = 950 m. So 950 m is 2 × the width, so the width of the field is 950 m ÷ 2 = 475 m.

8. C

The difference between hottest and coldest was 27 °C – 14 °C = 13 °C, so A isn't true. The maximum was 27 °C and the minimum was 14 °C, so B and E aren't true. The most common value was 27 °C (it appears twice in the list), so D isn't true. In order, the temperatures are: 14 °C, 18 °C, 24 °C, 27 °C, 27 °C. So the third-coldest temperature was 24 °C, and so C is true.

9. B

Start by finding the other unknown angle in the triangle. Angles on a straight line add up to 180°, so this angle is 180° – 65° = 115°. Angles in a triangle add up to 180°, so 115° + 30° + x = 180°. So 145° + x = 180°, and x = 180° – 145° = 35°.

10. D

3m – 7 = 20 means that 20 is 7 less than 3m, so 3m = 27. The only number that multiplies by 3 to give 27 is 9, so m = 9.

Test 14 — pages 43-45

1. C

You're adding a number to 37 to make 121, and the opposite of addition is subtraction. Subtracting 37 from 121 gives 84.

2. A

Pentagons have 5 angles. The angles in a regular pentagon are all obtuse angles (between 90° and 180°) so a regular pentagon has no acute angles.

3. 863.8

0.7 = 7 ÷ 10, so 1234 × 0.7 will be equal to 1234 × 7 divided by 10: 8638 ÷ 10 = 863.8.

4. 31

The two smallest classes are Class 3 and Class 5. On the pictogram, Class 3 has 4 circles and Class 5 has 3³/₄ circles. Each circle is worth 4 pupils. So Class 3 has 4 × 4 = 16 pupils. The three full circles for Class 5 represent 3 × 4 = 12 pupils, and the ³/₄ of a circle is another 3 pupils. So Class 5 has 12 + 3 = 15 pupils. So the combined group has 16 + 15 = 31 pupils.

5. D

Count on 142 minutes from 14:45 in steps. 14:45 is 15 mins before 15:00. 142 – 15 = 127, so the film ends 127 mins after 15:00. 1 hour = 60 mins, so 2 hours = 120 mins. So the film ends at: 15:00 + 2 hours + 7 minutes, which is 17:07.

6. A

Imagine the two larger sections each split in half. This would give 8 sections in total. 3 of these sections would have a star (the large star section would create two smaller star sections). So the fraction of the spinner made up of star sections is ³/₈.

7. D

The volume of the cuboid is 6 cm × 4 cm × 2.5 cm. 4 × 2.5 = 10, so the volume is 6 × 10 = 60 cm³.

8. A

1 litre = 1000 ml, so 1.75 litres = 1750 ml. So the total amount of paint is 1750 + 480 + 610 = 2840 ml (use the column method). She uses half of this, so she has half left over. This is 2840 ÷ 2 = 1420 ml, which is 1.42 litres.

9. 204

Joan took as many photos on day 7 as on days 1-6 put together. So she took half of all her photos on day 7. Half of 800 is 400, so she took 400 photos on days 1-6. On days 4-6 she took 53 + 124 + 19 = 196 photos. So on days 1-3 she took 400 – 196 = 204.

10.   71

The number of squares in each pattern is 1, 5, 11, 19... So first you add 4, then 6, then 8, and so on. So the number of squares added increases by 2 each time. So the next terms are 19 + 10 = 29, 29 + 12 = 41, 41 + 14 = 55 and 55 + 16 = 71.

Test 15 — pages 46-48

1.   C

Point F is 3 squares away from the mirror line, so its reflection will also be three squares away from it, but on the other side of the line. This is (-2, 4).

2.   –22

If you subtract from a negative number, it gets further away from zero on the number line, so counting down 9 from – 13 gives –22.

3.   D

The total number of seats is 9 × 11 + 10 × 12 = 99 + 120 = 219.

4.   B

There were 60 people in total, and 28 had a ham sandwich, so 60 – 28 = 32 people had a cheese sandwich. 15 of those had a banana, so 32 – 15 = 17 people had a cheese sandwich and an apple.

5.   D

The first three options are too small — 500 ml is only about the size of a small bottle of water. 150 000 000 ml is 150 000 litres, which would be an enormous amount for just 4 fish. So the sensible answer is 150 000 ml, or 150 litres.

6.   A

The sport section of the chart is 60°. The full circle is 360°, so as a fraction, the sport section is $^{60}/_{360}$ = $^6/_{36}$ = $^1/_6$ of the pie chart. There are 24 hours in a day, so the number of hours of sport is 24 ÷ 6 = 4 hours.

7.   D

The faces all have either two or four lines of symmetry. 1, 4 and 5 have four lines:

2, 3 and 6 have two lines:

So the only pair where both have the same number of lines of symmetry is D.

8.   11

Check the factors of 66 that are greater than 5 and see if they're prime. The first one is 6, but this isn't prime. The next one is 11, which is prime. So 11 must be the number he's thinking of.

9.   92 m²

Divide the shape up into two rectangles: a 9 m × 8 m one and a 5 m × (13 – 9 = 4m) one. The total area is the sum of the two: 4 × 5 + 9 × 8 = 20 + 72 = 92 m².

10.   £6.60

t is the number of toppings, so here t = 4. So the price will be P = 5 + (0.4 × 4) = 5 + 1.6 = 6.6. This is £6.60.

Puzzles 3 — page 49

Whose House?

19: Edgar, 21: Bex, 23: Carrie, 25: Don, 27: Anna.

Crazy Computer

♥ = 5, ▽ = 8, ● = 1, ▲ = 3, Y = 0, ✱ = 2, ⧨ = 4, ▌ = 7, ▐ = 6, ▣ = 9
The code Captain Calculator needs to enter is 9402.

Test 16 — pages 50-52

1.   C

The section of the pie chart with the biggest angle is the most common colour — this is silver.

2.   20

There are 1000 g in 1 kg, so 1.5 kg = 1.5 × 1000 = 1500 g. 75 g × 2 = 150 g, and 150 g × 10 = 1500 g, so Chelsea can make 2 × 10 = 20 piles of sugar.

3.   C

Add up all the ages and divide by the number of children: 11 + 8 + 4 + 3 + 3 + 1 = 30. 30 ÷ 6 = 5.

4.   47°

Angles in a straight line add up to 180°. So x = 180° – 133° = 47°. (Do this using partitioning.)

5.   B

Use estimating here — round 807 down to 800 and 4096 down to 4000. Then 800 × 4000 = 3 200 000. The only possible option is B, so 807 × 4096 = 3 305 472.

6.   B

T is 5 units directly above line S. So line L will be 5 units above line S at all times, because they are parallel. So at the y-axis, S is at (0, 2). 5 units above this is (0, 7).

7.   9

Work backwards here. 44 ÷ 2 = 22. 22 – 4 = 18. 18 ÷ 2 = 9. So Cally started with the number 9.

8.   A

$^1/_3$ of 240 is 240 ÷ 3 = 80. Now work out 15% of 80: 15% = 10% + 5%. 10% of 80 is 80 ÷ 10 = 8. 5% is half of 10%, so 5% of 80 is 8 ÷ 2 = 4. So 15% of 80 is 8 + 4 = 12.

9.   A

If the width is x m and the length is 5 m more than the width then the length is (x + 5) m. The area of a rectangle is the width multiplied by the length — so the garden's area is x(x + 5). You're told that the area is 126 m², so the equation is x(x + 5) = 126.

10.   C

$^1/_5$ of the sweets are cherry, which is 5 out of 25. After John has picked and eaten one cherry sweet, 4 out of 24 of the sweets are cherry. Writing this as a fraction, $^4/_{24}$ is the same as $^1/_6$.

Test 17 — pages 53-55

1.   C

Hexagons are shapes with six straight sides. C is the only option that has six sides.

2.   200 503

Two hundred thousand is 200 000. Five hundred and three is 503. Adding these together gives 200 503.

3.   3

Reading off the graph, you can see that on Friday, Linda sold 11 guitars and Wayne sold 8 guitars. So the difference is 11 – 8 = 3.

4.   C

Convert them all into the same form. 50% is the same as 0.5. $^4/_{10}$ is the same as 0.4. $^1/_2$ is the same as 0.5. The smallest decimal is 0.4, so the answer is $^4/_{10}$.

5.   B

To get from one term to the next you add on 1, then 2, then 3, and so on. So the next term after 11 is 11 + 5 = 16, and the term after this is 16 + 6 = 22.

6.   D

The area of a triangle is $^1/_2$ × base × height. So the area of this triangle is $^1/_2$ × 9 × 6. $^1/_2$ × 6 = 3, so $^1/_2$ × 9 × 6 = 3 × 9 = 27 cm².

7.   D

45.9 × 66.26 is the same as 459 × 6626 except there are three digits after the decimal points. Taking 3 041 334 and moving the decimal point three places to the left gives 3041.334.

8.   C

If Louise bought 3 kg made up of 500 g bags, then she would need 6 bags. This would cost £1.60 × 6 = £9.60 (use the partitioning method). If she bought 3 kg made up of 1.5 kg bags, then she would need 2 bags. This would cost £3.60 × 2 = £7.20. The difference is £9.60 – £7.20 = £2.40.

9.   C

Combining the x terms gives 6x + 2x = 8x. Combining the number terms gives 3 – 8 = -5. So it simplifies to 8x – 5.

10.   D

An octagon has 8 sides, so put 8 into the expression — 180(8 – 2) = 180 × 6 = 1080° (use partitioning).

Test 18 — pages 56-58

1.   C

10 bananas would cost £0.18 × 10 = £1.80. 11 bananas would cost £1.80 + £0.18 = £1.98. Another banana would take the cost over £2, so he can buy 11 bananas.

2.   A

mm, cm and m are all too small to measure this distance. m² measures area, not distance. So km is the most suitable out of the options given.

3.   23.3 kg

Sarah's heaviest pet is 23.5 kg. Her lightest pet is 200 g which is equal to 0.2 kg (because 1000 g = 1 kg). The difference is 23.5 – 0.2 = 23.3 kg.

4.   C

The shorter side + the longer side make up half the perimeter of a parallelogram, which is 62 ÷ 2 = 31. So the length of the shorter side is 31 – 19 = 12 cm.

5.   D

You can find this by subtracting 2 from each option and seeing which one gives a multiple of 3. 23 – 2 = 21, which is equal to 7 × 3, so 23 is the correct option.

6.   4

In the rows for Mrs Robinson and Miss McKenzie, there is a total of $8^{1}/_{2}$ pictures of CDs, representing 34 CDs. There is a quarter of a picture of a CD in the row for Miss Elliot, so the number in the key must divide exactly by 4. $8^{1}/_{2} \times 4 = 34$, so the answer is 4.

7.   C

You're rounding to the nearest thousandth so you have to look at the last digit in this number — it's 6, so you round the thousandths digit up to give 7892.322.

8.   C

Monday to Friday is 5 days, so Miss Leigh marks $50 + 45 + 40 + 35 + 30 = 200$ papers (you can use the column method here).

9.   3

Joining the first cross will make a triangle. Joining the second cross gives a square (a regular quadrilateral). The other three crosses make kites, which are irregular quadrilaterals.

10.   12

The width is $2x$, and the length is twice the width, i.e. $2x \times 2 = 4x$. So the perimeter is $2x + 4x + 2x + 4x = 12x$. If Joanna paints x m per minute then it will take 12 minutes.

Test 19 — pages 59-61

1.   E

The factors of 30 are 1, 2, 3, 5, 6, 10, 15, 30. The factors of 15 are 1, 3, 5, 15. So there are four factors the same — all of the factors of 15.

2.   27 °C

The warmest temperature is 11 °C, and the coldest is −16 °C. The difference between −16 and 0 is 16, and the difference between 0 and 11 is 11. So the difference between −16 and 11 is $16 + 11 = 27$ °C.

3.   100 seconds

Amy takes 25% longer than 80 seconds. 25% of 80 is $80 \div 4 = 20$. So Amy takes $80 + 20 = 100$ seconds.

4.   C

250 cm = 2.5 m. The area is width × length, which is $2.5 \times 4 = 10$ m².

5.   C

Round 35 274 to 40, and round 6.35 to 6. So there are about $40 \times 6 = 240$ ounces in a stone. The only answer close to this is 224.

6.   10

The 'men' bar for skiing is 7.5 units tall. Each vertical unit represents 2 people, so this is $7.5 \times 2 = 15$ men. The 'women' bar for skiing is 2.5 units tall. This is $2.5 \times 2 = 5$ women. So $15 − 5 = 10$ more men than women chose skiing.

7.   E

A scalene triangle has no lines of symmetry. An isosceles triangle and kite each have 1 line of symmetry. A rectangle has 2 lines of symmetry, and an equilateral triangle has 3. So the answer is option E.

8.   A

There are six sides of length 1 cm and ten sides of length 5 cm. So the perimeter is $6 \times 1 + 10 \times 5 = 6 + 50 = 56$ cm.

9.   E

Making a triangle from A or D gives a right-angled triangle. Making a triangle from B or C gives an isosceles triangle. So the answer is E.

10.   B

The best way to do this question is to just try the options — for option A, you get $^{1}/_{2} \times 5 \times 6 = 15$. For option B you get $^{1}/_{2} \times 7 \times 8 = 28$. So the answer is 7.

Test 20 — pages 62-64

1.   B

There are 100 cm in 1 m, so the road is $236\,515 \div 100 = 2365.15$ m long. There are 1000 m in 1 km, so the road is $2365.15 \div 1000 = 2.36515$ km long.

2.   10

The sector for 'Comedy' is 60°, and $^{60}/_{360} = ^{1}/_{6}$. So $^{1}/_{6}$ of the people asked said 'Comedy'. 60 people were asked, and $^{1}/_{6}$ of 60 is $60 \div 6 = 10$ people.

3.   B

You can make a triangle, parallelogram, trapezium and hexagon, as shown. So the answer is B — rectangle.
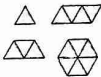
4.   B

The area of the triangular face is $^{1}/_{2} \times 9 \times 5$, so the volume of the prism is $^{1}/_{2} \times 9 \times 5 \times 4 = 9 \times 5 \times 2 = 9 \times 10 = 90$ cm³.

5.   870 g

24 bags of crisps weigh $24 \times 30 = 720$ g (use partitioning by breaking 24 into 20 + 4). Adding on the weight of the box gives $720 + 150 = 870$ g.

6.   18.88 s

The slowest time was Andrew's at 47.82 s. The quickest time was Thomas's at 28.94 s. Subtract to find the difference:

$$\begin{array}{r} 4\,7.\,8\,2 \\ -\,2\,8.\,9\,4 \\ \hline 1\,8.\,8\,8 \end{array}$$

So the time difference was 18.88 seconds.

7.   D

If a number is a multiple of both 5 and 6 then it is a multiple of 30. To find the multiples of 30 between 400 and 500, you can divide all the numbers by 10 — so look for multiples of 3 between 40 and 50. There are three — 42, 45 and 48. So multiples of both 5 and 6 between 400 and 500 are 420, 450 and 480.

8.   C

You're looking for the formula that The Number Cruncher uses. Try out each expression and see which one works. The numbers that go into the Number Cruncher are the different values of x and the numbers that come out are the results of the expression. $2x + 7$ is the only one which works for all the numbers, so the correct option is C.

9.   C

The field Gregory is ploughing has an area of $300 \times 400 = 120\,000$ m². If he ploughs 200 m² per minute, then it'll take him $120\,000 \div 200 = 600$ mins to plough the field (use cancelling down here). There are 60 mins in an hour, so 600 mins is $600 \div 60 = 10$ hours. Gregory starts at 9:00 am. Ten hours after this is 7:00 pm.

10.   E

Try each option as the starting number for Keith's sequence. For option A, the sequence is −1, 1, 1, 1, ... For option B, the sequence is 0, 0, 0, 0, ... For option C, the sequence is 0.5, 0.25, ... For option D, the sequence is 1, 1, 1, 1, ... For option E, the sequence is 2, 4, 16, ... Option E is the only sequence where each term is greater than the previous term, so 2 was Keith's starting number.

Puzzles 4 — page 65

The Chess Tournament

The only possible option for the next game is Andrew against Mohammed.

Pete's Pieces of Pizza

E.g. for Pizza 3:
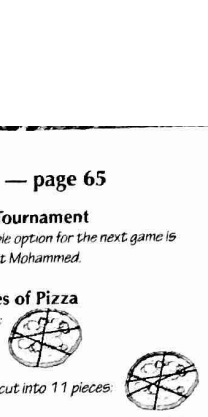
Pizza 4 can be cut into 11 pieces.

Make a table showing the Pizza number and the maximum number of pieces that can be cut from it:

Pizza	1	2	3	4
Number of pieces	2	4	7	11

To find the next number of pieces, you add on one more than last time. So for Pizza 5 there will be $11 + 5 = 16$ pieces, and for Pizza 6 there will be $16 + 6 = 22$ pieces.

Test 21 — pages 66-68

1.   13.5 mm

An equilateral triangle has 3 equal sides. So the perimeter is 3×4.5. 4.5 breaks down into 4 + 0.5. $3 \times 4 = 12$, and $3 \times 0.5 = 1.5$. So $3 \times 4.5 = 12 + 1.5 = 13.5$ mm.

2.   C

A, B, D and E each have 1 line of symmetry. C has 4 lines of symmetry.

3.   D

You're looking for the month with the biggest difference between the heights of the two bars. This is April.

4.   4280

You're adding two values which are both the result of multiplying something by 2140. So it's '1.1 lots of 2140' plus '0.9 lots of 2140', which gives $1.1 + 0.9 = 2$ lots of 2140. $2 \times 2140 = 4280$.

5.   D

Add up the prices of all items on the table. $4.00 + 3.20 + 6.00 + 2.00 + 0.80 = 16.00$. She spends £14, so the one item she doesn't buy has price £16 − £14 = £2. This is the glove.

6.   C

AB is vertical, so PQ must be horizontal. So P and Q must have the same y coordinate. The only option where P and Q have the same y coordinate is C.

7. C
Siobhan's sequence is 50, 38, 26, 14, 2...
So she will count the number 2.

8. –1 °C
16:30 is 4$\frac{1}{2}$ hours after noon (12:00). The temperature drops 1 °C every half an hour, so it drops 2 °C every hour. Over 4$\frac{1}{2}$ hours, the temperature will drop by (4 × 2) + 1 = 9 °C. 9 °C less than 8 °C is –1 °C.

9. 125 cm²
The width of the whole shape is 25 cm. It is 5 squares wide, so the side length of each square is 25 cm ÷ 5 = 5 cm. So the area of one square is 5 × 5 = 25 cm². There are 3 whole squares and 4 half-squares. The 4 half-squares make 2 full squares. This gives a total of 5 whole squares. So the total area is 5 × 25 cm². 4 × 25 = 100, so 5 × 25 is 100 + 25 = 125. So the area is 125 cm².

10. D
10% of 50 is 50 ÷ 10 = 5, so there are 5 ready salted. $\frac{1}{5}$ of 50 is 50 ÷ 5 = 10, so there are 10 cheese and pickle. There are also 10 prawn cocktail. Adding these up gives 5 + 10 + 10 = 25. So there are 50 – 25 = 25 roast chicken. So the flavour with the most bags is roast chicken.

Test 22 — pages 69-71

1. C
Sally will make a cup of tea at: 09:00, 10:30, 12:00... Jordi makes a cup of tea every hour, so he will also make one at 12:00.

2. B
The strip of cloth measures 8.4 cm. 10p per cm would cost 84p, so 5p per cm is half of this. 84p ÷ 2 = 42p. This is £0.42.

3. 19
The calculation on the left is the same as 4 × 38. 8 is double 4, so the number you're looking for must be half of 38. 38 ÷ 2 = 19.

4. A
500 g is half a kilogram, so there are 12 lots of 500 g in 6 kg. 12 × 99p = 12 × £1 – 12 × 1p = £12 – 12p = £11.88.

5. 6
The total number of fish for the first 4 days is 4 × 7 = 28. So the total over the 5 days is 28 + 2 = 30. The mean for this period is 30 ÷ 5 = 6.

6. B
Find the point halfway between 4 and 5 on the horizontal axis. Read up to the line, then across to the vertical axis. You end up halfway between 3 and 4, which is 3.50 Westmorland Dollars.

7. 40
First take off the extra 13 that Harriet has: 67 – 13 = 54. This number of pigeons is split equally between them, so they each have 54 ÷ 2 = 27. Adding the extra 13 back on gives 27 + 13 = 40.

8. D
The 3 angles add up to make a right angle (90°). So a + 2a + b = 90°. The a and 2a add together to give the expression 3a + b = 90°.

9. 144°
The whole pie chart is 360°. 10% of this is 36°, so 40% is 4 × 36°. 36 breaks into 30° + 6°. 4 × 30° = 120° and 4 × 6° = 24°, so 4 × 36° = 120° + 24° = 144°.

10. A
Think of the box as being a 10 m × 7 m × 3 m cuboid with a 5 m × 3 m × 3 m cuboid removed. 10 × 7 × 3 = 10 × 21 = 210 m³. 5 × 3 × 3 = 5 × 9 = 45 m³. So the box has volume 210 – 45 = 165 m³.

Test 23 — pages 72-74

1. C
Use the horizontal lines on the chart to help you compare the heights. Adding the 'Bus' bar to the 'Car' bar will give a total height the same as the 'Bike' bar.

2. A
The amount of water in the beaker is about $\frac{1}{5}$ of the total volume of the beaker. So 100 ml is the best estimate for the amount of water.

3. 260 mm²
The area of the rectangle is 10 × 22 = 220 mm². The area of each triangle is $\frac{1}{2}$ × base × height = $\frac{1}{2}$ × 10 × 4 = 5 × 4 = 20 mm². So the total area of the whole shape is 220 + 20 + 20 = 260 mm².

4. 76 miles
His mean daily distance was 532 miles ÷ 7. The best way to find this is write out the calculation:

$$\begin{array}{r} 0.76 \\ 7\overline{)532} \end{array}$$

5. 12
The sequence of her distances is 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26...
26 is the 12th term, so she runs 26 miles in week 12.

6. A
The hole has two sides of length 8 cm, two sides of length 3 cm, and four sides of length 6 cm. So the perimeter is 2 × 8 + 2 × 3 + 4 × 6 = 16 + 6 + 24 = 16 + 30 = 46 cm.

7. E
Out of the numbers 1-6, three of them are factors of 10 — these are 1, 2, and 5. As a fraction, this is $\frac{3}{6}$, which is the same as $\frac{1}{2}$.

8. D
There are 100 cm in 1 m, so there are 200 lots of 0.5 cm in 1 m. So it takes the snail 200 seconds to travel 1 m, which is the same as 3 minutes 20 seconds.

9. B
There are 200 houses and the postman delivers to 2 houses per minute, so it takes him 200 ÷ 2 = 100 minutes. Including the break, this gives 100 + 20 = 120 minutes, which is equal to 2 hours. Two hours after 4:20 am is 6:20 am.

10. C
0.75 litres of red paint + 2.25 litres of yellow paint gives a total of 3 litres of tangerine paint. Four lots of this will give the total of 12 litres that she needs. So the amount of red paint she needs is 4 × 0.75 litres. 0.75 breaks into 0.7 + 0.05. 4 × 0.7 = 2.8 and 4 × 0.05 = 0.2, so 4 × 0.75 = 2.8 + 0.2 = 3 litres.

Test 24 — pages 75-77

1. B
270° is $\frac{3}{4}$ of a turn. $\frac{3}{4}$ of a turn clockwise will land the pointer on the section labelled with the letter B.

2. B
5 × 50p = £2.50. 10 × 20p = £2. This gives a total of £4.50, so the rest is 50p, which is 5 lots of 10p.

3. C
2 hours after 10:53 is 12:53. Another 7 minutes takes you to 13:00. There are 42 – 7 = 35 minutes of journey time still remaining. So he arrives at 13:35.

4. £18
The total number of cars he washed was: 5 + 4 + 6 + 7 + 8 = 30. So the mean number of cars washed per day was 30 ÷ 5 = 6, and the mean amount he earned was 6 × £3 = £18.

5. 1
The width of the box is 3 cm, so it's wide enough to hold exactly 1 cube. This leaves 1 cm in its height, which isn't big enough to fit another cube, and 2 cm in its length, which also isn't big enough for another cube. So just 1 cube will fit inside the box.

6. C
Go through each option in turn:
10% of 158 is 158 ÷ 10 = 15.8.
$\frac{1}{2}$ of 30 is 30 ÷ 2 = 15, so you can rule out option A.
0.1 × 100 = 10, so you can rule out option B.
$\frac{1}{3}$ of 24 is 24 ÷ 3 = 8, so $\frac{2}{3}$ is 8 × 2 = 16, so you can rule out option D.
10% of 90 is 90 ÷ 10 = 9, so 20% is 9 × 2 = 18, so you can rule out option E.
So option C gives the smallest answer.

7. D
60 cm is 75% of the original size. You need to find 100%, so first find 25% and then multiply by 4. 75 ÷ 3 = 25, so 25% is 60 ÷ 3 = 20 cm. Then 4 × 25 = 100, so the original painting size is 20 × 4 = 80 cm.

8. 37%
The 'Brown' section starts at 22% and ends at 59%. The percentage for this section is 59% – 22% = 37%.

9. C
All of the points on this line will have x and y coordinates which are negatives of each other. The only one that doesn't match this is (2, 2), where the x and y coordinates are the same.

10. D
There are 2 sides of length 4x and 2 sides of length 2. So the perimeter is 4x + 4x + 2 + 2 = 8x + 4.

Test 25 — pages 78-80

1. A
90° is $\frac{1}{4}$ of a turn. Turning the shape $\frac{1}{4}$ of a turn anticlockwise gives shape A.

2. B
B is the only one which follows the rule:
(2 × 3) – 2 = 6 – 2 = 4, and (4 × 3) – 2 = 12 – 2 = 10.

3. £11
10 buzz cuts gives 10 × £5.50 = £55. 5 flat tops gives 5 × £9 = £45. Adding these together gives £55 + £45 = £100. So £44 came from mohawks. £44 ÷ 4 = £11.

4. 60 cm

Each triangle has perimeter 45 cm, so has side length 45 ÷ 3 = 15 cm. The new shape has 4 sides of length 15 cm, so has perimeter 4 × 15 = 60 cm.

5. C

The lengths of the fish pictures show the number of fish caught with each rod — so the Angler's Dream caught 4 fish, and the Fish-o-matic caught 12 fish. But the Fish-o-matic picture looks a lot more than 3 times bigger than the Angler's Dream picture, which makes it seem like it caught even more fish than it actually did.

6. C

Of the options, 1110 and 1105 will round to 1110 to the nearest 10. 1105 is the smallest of these.

7. E

1 picture represents 4 eggs, so 8 pictures represents 8 × 4 = 32 eggs. $^1/_4$ of a picture represents 1 egg, so $^3/_4$ of a picture will represent the 3 remaining eggs. So in total, Rhoda needs $8^3/_4$ egg pictures.

8. 70°

Angles around a point add up to 360°. The 20°, 40° and 90° angles add up to 150°, and the 2x and x angles add up to 3x. So 3x + 150° = 360°. 360° − 150° = 210° (use partitioning or the column method), so 3x = 210°. 210 ÷ 3 = 70, so x = 70°.

9. 720 g

450 g of mince for 5 people means that she uses 450 g ÷ 5 = 90 g per person. So for 8 people, she'll need 8 × 90 g = 720 g.

10. D

$^1/_5$ are from Britain, so the total number of stamps can be divided exactly by 5. $^1/_3$ are from France, so the total number can be divided by 3, and $^1/_4$ are from Sweden, so the total number can be divided by 4. The only option which divides exactly by 5, 3 and 4 is 60 (60 ÷ 5 = 12, 60 ÷ 3 = 20, and 60 ÷ 4 = 15).

Puzzles 5 — page 81

Maths Crossword

Test 26 — pages 82-84

1. C

You find each term by subtracting 10 from the previous term. So continuing the sequence will go 25, 15, ... So the fifth term is 15.

2. 29 670

43 = 4.3 × 10 and 690 = 6.9 × 100, so 43 × 690 will be 10 × 100 = 1000 times bigger than 4.3 × 6.9. 29.67 × 1000 = 29 670.

3. $^5/_6$

Out of the numbers 1-6, five of them are factors of 12 — 1, 2, 3, 4 and 6. As a fraction, this is $^5/_6$.

4. D

The diameter of a circle is the distance all the way across. So this is double the distance from the centre to the edge. So the diameter is 2 × 32 cm = 64 cm.

5. D

Read off the graph at 1910:

It is approximately 180 000 people.

6. C

1.1 kg = 1100 g, so there are 1100 ÷ 100 = 11 lots of 100 g. So Audrey needs to cook the chicken for 11 × 5 + 25 = 55 + 25 = 80 minutes. This is equal to 1 hour 20 minutes.

7. B

Each leg has volume 4 × 4 × 50 = 4 × 200 = 800 cm³. Four legs have a volume of 4 × 800 = 3200 cm³. The top is 20 × 20 × 1 = 20 × 20 = 400 cm³. So the total volume is 3200 + 400 = 3600 cm³.

8. D

If Ethan gives away half the lace to his big sister then he has half remaining. $^1/_2$ is the same as $^3/_6$, so when he cuts the remaining half into three pieces, each piece is $^1/_6$. Ethan keeps one of these for himself, which is $^1/_6$.

9. 44 cm

When Mark puts together the two 5 cm sides, they don't make any part of the perimeter of the parallelogram. So the only sides that count towards the perimeter are those with lengths 9 cm and 13 cm. So the perimeter is 9 + 13 + 9 + 13 = 44 cm.

10. 4%

Mrs Biggs has 5 + 7 + 7 + 4 + 1 + 1 = 25 pupils in her class. One pupil has 5 or more siblings. As a fraction, this is $^1/_{25}$, which is the same as $^4/_{100}$, or 4%.

Test 27 — pages 85-87

1. 35%

There are 20 squares, of which 7 have been shaded. As a fraction, this is $^7/_{20}$. Multiplying the numerator and denominator by 5 gives $^{35}/_{100}$, which is 35%.

2. C

The total number of sweets is 7 + 6 + 8 + 8 + 11 = 40. There are 5 bags, so the mean is 40 ÷ 5 = 8.

3. 105 days

12th June is the earliest date, and 25th September is the latest date. So Mick is the oldest and Barry is the youngest. There are 30 days in June, so there are 18 days from 12th June to the end of June. July and August each have 31 days, and then there are 25 days from the start of September to Barry's birthday. So Mick is 18 + 31 + 31 + 25 = 105 days older than Barry.

4. C

The angle of the 'No' sector of the pie chart is 360 − 200 = 160°. This represents 16 people, so in the pie chart, each person is 160° ÷ 16 = 10°. So the 'Yes' sector represents 200° ÷ 10° = 20 people.

5. 3 cm

A cube has six identical square faces. If the total area of all these faces is 54 cm², then each face has area 54 ÷ 6 = 9 cm². 9 = 3 × 3, so the side length is 3 cm.

6. 69°

In a parallelogram, there are two pairs of equal angles. All of the angles add up to 360°, so two different angles will add up to 180°. So the angle you're asked to find is 180 − 111 = 69°.

7. D

Moving two squares to the right of (−4, 5) ends up at (−2, 5). Moving diagonally across one square, you could end up at one of (−3, 6), (−3, 4), (−1, 6) or (−1, 4). So the answer is D.

8. C

If the square in the centre has a perimeter of 20 cm, then each side length is 20 ÷ 4 = 5 cm. The outer perimeter has 20 sides, so is 5 × 20 = 100 cm.

9. 820

The trick here is to spot that 6 × 82 is the same as 12 × 41. So now you have the expression: 8 × 41 + 12 × 41, which is the same as 20 × 41, which is 820 (you can use partitioning here).

10. D

You can see in the diagram of the stacked pots that the number of pots gets multiplied by 3 cm, and the 8 cm is added on. So the answer is 3x + 8.

Test 28 — pages 88-90

1. C

One pineapple costs 95p. One apple costs 15p, so three apples cost 3 × 15 = 45p. So in total Joan spends 95 + 45 = 140p, which is equal to £1.40.

2. E

A and C each have 2 lines of symmetry, and B and D each have 1. E has 3 lines of symmetry.

3. 1.25 kg

The mass of the pumpkin is equal to the difference in the readings on the two scales. The reading on the first scale is 2.5 kg. The reading on the second scale is 1.25 kg (halfway between 1 kg and 1.5 kg). 1.25 is half of 2.5, so 2.5 − 1.25 = 1.25 kg.

4. C

Volume = length × width × height, so: 280 = 14 × 2 × height. 14 × 2 = 28, so: 280 = 28 × height, and so the height is 10 m.

5. 3

12 × 9 = 108, so she can fill 12 pots with 9 pencils each. Then the 111 − 108 = 3 remaining pencils will go in the final 13th pot.

6. A

B is incorrect because the value for week 3 is greater than the value for week 1, but on the graph the bar for week 1 is higher. C and D are incorrect because the values for week 1 are higher than those for week 2, which you can see is wrong from the graph. E is incorrect because the value for week 4 is higher than the value for week 5, which doesn't match the graph. A is the only set of values which matches the graph.

7. 20%

If you bought 4 individual glasses, it would cost 4 × £17.50. 17.5 breaks down into 10 + 7 + 0.5. 4 × 10 = 40, 4 × 7 = 28 and 4 × 0.5 = 2. So 4 × £17.50 = £40 + £28 + £2 = £70. Buying a set would save you £70 – £56 = £14. As a fraction, this saving is $^{14}/_{70}$. Dividing the numerator and denominator by 7 gives $^2/_{10}$, which is $^{20}/_{100}$, or 20%.

8. B

1 cm = 10 mm, so 9 cm = 90 mm. An increase of 90 mm will take 90 ÷ 2 = 45 years.

9. D

25 km is not shown on the graph, but 2.5 km is. From the graph, 2.5 km = 1.5 miles. Multiplying both of these values by 10 gives 25 km = 15 miles.

10. B

$12x \div 2 = 6x$. $3x \times 2 = 6x$. $7x - x$ is $7x - 1x = 6x$. $4x + 2$ doesn't simplify — only one of the terms has an x. (Don't get it confused with $4x + 2x$).

Test 29 — pages 91-93

1. 290 625

The new reading is 289 783 + 842. You can use the column method to find this:
```
  289783
+    842
  290625
```

2. C

A right angle is 90°, so the other angle is: 90° – 83° = 7°.

3. D

120 g breaks down into 80 g + 40 g, and 40 g is half of 80 g, so Damian has 1$^1/_2$ times the amount of butter needed. The total weight of flour and sugar in the original recipe is 100 g + 100 g = 200 g. So he should use 1$^1/_2$ lots of 200 g, which is 200 + 100 = 300 g.

4. C

Moving 8 squares east (to the right) gives the x coordinate 3. Moving 4 squares south (down) gives the y coordinate 0. So the new coordinates are (3, 0).

5. E

10, 3 and 15 are factors of 60. Out of these, 10 and 15 are multiples of 5. 10 + 1 = 11, which isn't square. 5 + 1 = 6, which isn't square. 15 + 1 = 16 = 4², so 15 is the only one which is 1 less than a square number.

6. A

Use estimating here — a cup holds 256 ml, so there are about 4 cups in 1 litre. A bathtub holds 189.4 litres of water, which is approximately 200 litres. So you can fill about 4 × 200 = 800 cups from a full bathtub, and so the only possible answer is option A: 739.

7. E

35% is $^{35}/_{100}$, which is equivalent to 0.35, not 3.5.

8. 121

The sequence is the square numbers. So the 11th term is $11^2 = 11 \times 11 = 121$.

9. 90

For every 1 card that Lara has, Elise has 3. So Lara has 1 out of every 4 = $^1/_4$ of the cards. $^1/_4$ of 120 = 120 ÷ 4 = 30, so Lara has 30 cards, and Elise has 3 times as many: 3 × 30 = 90.

10. D

The shape is a 6 m × 10 m rectangle with a triangle of base 7 m and height 4 m removed. The rectangle's area is 6 × 10 = 60 m² and the triangle's area is $^1/_2$ × 7 × 4 = 7 × 2 = 14 m². So the answer is 60 – 14 = 46 m².

Test 30 — pages 94-96

1. D

You can use rounding to answer this question. 7980 rounds to 8000 to the nearest thousand, and 3.8 rounds to 4 to the nearest whole number. 8000 ÷ 4 = 2000. So the only possible option is 2100.

2. 7

The 'Paint' sector is a right angle, so it makes up $^1/_4$ of the circle. So $^1/_4$ of the people said that paint is their favourite. This is 28 ÷ 4 = 7.

3. B

25 minutes after 13:30 is 13:55. 10 minutes after this is 14:05. Then, breaking down the final hour and a half into 1 hour + 30 minutes, 1 hour after 14:05 is 15:05, and 30 minutes after this is 15:35.
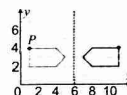
4. B

Viewed from above, there will be 4 squares across, plus 1 square below the 4th square from the left. This is B.

5. C

There are 3 + 5 + 12 = 20 ties in total, of which 3 + 12 = 15 are not spotty. As a fraction, this is $^{15}/_{20}$. Dividing numerator and denominator by 5 gives $^3/_4$.

6. C

The reflected shape will look like this

So the new coordinates of P are (11, 4).

7. 24 miles

The mean is the total number of miles divided by the number of days. This is 120 ÷ 5. 120 breaks down into 100 + 20. 100 ÷ 5 = 20, and 20 ÷ 5 = 4, so 120 ÷ 5 = 20 + 4 = 24.

8. 160

2 sheets of card will have a total thickness of 1 mm. 1 cm = 10 mm, so 8 cm = 80 mm. So the 8 cm pile contains 80 lots of 2 sheets: 2 × 80 = 160 sheets.

9. D

Substitute n = 3 into the formula: 10 – 4(3) = 10 – 12 = –2.

10. C

All of the horizontal sides add up to two lots of 9 m, which is 18 m in total. Then there are two vertical sides of length y and two vertical sides of length y + 2. So the vertical sides add up to $y + y + (y + 2) + (y + 2) = 4y + 4$. So the perimeter is $18 + 4y + 4 = 22 + 4y$.

Test 31 — pages 97-99

1. C

120 324 breaks down into 120 000 + 324, which is 'one hundred and twenty thousand', plus 'three hundred and twenty four'. So C is correct.

2. C

An obtuse angle is between 90° and 180°. A, B, D and E are less than 90° (acute). C is the only obtuse angle.

3. D

Marissa uses 12 m² worth of paint out of a total of 48 m². As a fraction, this is $^{12}/_{48}$. Dividing the numerator and denominator by 12 simplifies this to $^1/_4$. So she has used $^1/_4$ of the tin, and $^3/_4$ is left over.

4. 82

22% + 37% = 59%, so the percentage of non-fiction books is 100% – 59% = 41%. So 41 out of every 100 books are non-fiction. Madison has 200 books in total, so 41 × 2 = 82 are non-fiction.

5. C

The triangle is isosceles, so the other angle at the base of the triangle (inside the triangle) is 65°. Angles on a straight line add up to 180°, so a = 180° – 65° = 115°.

6. B

1 hour = 60 minutes, so 1 hour and 20 minutes is 60 + 20 = 80 minutes. George reads 2 pages per minute, so he has read 2 × 80 = 160 pages during this time. He has 860 – 160 = 700 pages left to read.

7. 45 minutes

Basketball has 2 balls and baseball has 1$^1/_4$ balls. So basketball has $^3/_4$ of a ball more than baseball. $^1/_4$ of a ball represents 60 ÷ 4 = 15 minutes, so $^3/_4$ of a ball represents 3 × 15 = 45 minutes.

8. D

Reuben has 2 + 5 + 8 + 1 = 16 pairs altogether, of which 5 + 1 = 6 are boots or slippers. As a fraction, this is $^6/_{16}$. Dividing the numerator and denominator by 2 simplifies this to $^3/_8$.
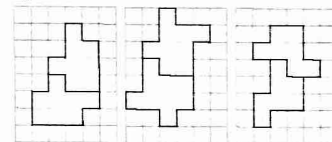
9. 15

If the mean of the 5 numbers is 12, then the sum of the 5 numbers must be 5 × 12 = 60. 13 + 7 + 9 + 16 = 20 + 25 = 45. So the fifth number is 60 – 45 = 15.

10. 8

Multiplication comes before subtraction in BODMAS, so 2 × 25 – 1 = 50 – 1 = 49. So you want the smallest number that will square to give more than 49. 7² = 49, so the smallest possible value of x is 8.

Puzzles 6 — page 100

Equal Shapes

E.g.

In each case, rotating one of the shapes will give the other shape.

Elevens

29 524 does divide exactly by 11.
312 581 doesn't divide exactly by 11.
The only number between 2 165 860 and 2 165 869 that is divisible by 11 is 2 165 867.