

Mental questions

- 1 Multiply seven by seven.

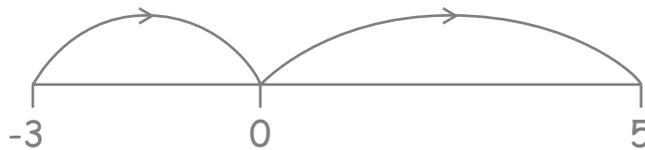
49

- 2 How many nines are there in fifty-four?

$$54 \div 9 = 6$$

6

- 3 What number should you add to negative three to get the answer five?



8

- 4 Add two point five to three quarters.

Either: $2.5 = 2\frac{1}{2}$, giving $2\frac{1}{2} + \frac{3}{4} = 3\frac{1}{4}$

or: $\frac{3}{4} = 0.75$, giving $2.5 + 0.75 = 3.25$

$3\frac{1}{4}$ or 3.25

- 5 I think of a number. I call it n .
I square my number and then add four.
Write an expression to show the result.

$$n \times n + 4 \text{ or } n^2 + 4$$

$n^2 + 4$

Car parking

A car park shows this sign.



Complete the table to show all the different ways of paying exactly 70p.

| Number of 10p coins | Number of 20p coins | Number of 50p coins |
|---------------------|---------------------|---------------------|
| 7 | 0 | 0 |
| 5 | 1 | 0 |
| 3 | 2 | 0 |
| 2 | 0 | 1 |
| 1 | 3 | 0 |
| 0 | 1 | 1 |

2 marks

Be systematic.

Check that there are no repeats.

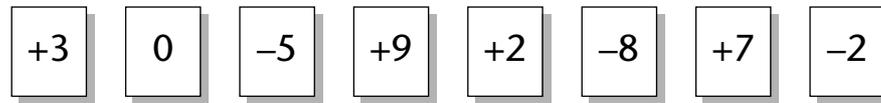
For example $10p + 50p + 10p$
and

$50p + 10p + 10p$ are repeats.

Numbers

You could use a number line to answer this question.

Look at these number cards.



(a) Choose a card to give the answer 4.

$$\boxed{+2} + \boxed{-5} + \boxed{+7} = 4$$

1 mark

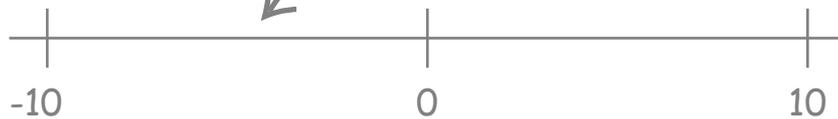
(b) Choose a card to give the lowest possible answer.

Fill in the card below and work out the answer.

$$\boxed{-2} + \boxed{-8} = \underline{-10}$$

2 marks

When adding a negative number, go to the left on the number line.



Mental questions

- 1 What is three fifths of forty pounds?

$$\frac{1}{5} \text{ of } \pounds 40 = \pounds 8$$

$$\text{so } \frac{3}{5} \text{ of } \pounds 40 = 3 \times 8 = \pounds 24$$

£24

- 2 What is the volume of a cuboid measuring five centimetres by six centimetres by seven centimetres?

$$5 \times 6 \times 7 = 30 \times 7 = 210 \text{ cm}^3$$

210 cm³

- 3 Look at these numbers. **37 69**
Add them.

37 + 69 is the same as

36 + 70 or 69 + 30 + 7.

Answer: 106

106

- 4 I start at one point seven and count up in equal steps.
'One point seven, one point eight, one point nine, ...'
What is the next number?

2 or two or 2.0

- 5 Write the ratio *twelve to six* in its simplest form.

12 : 6 (divide by 2)

6 : 3 (divide by 3)

2 : 1

2 : 1

Survey

Hakan asked 30 pupils which subject they liked best.

| Subject | Number of boys | Number of girls |
|---------|-----------------|-----------------|
| Maths | 4 (40%) | 7 (35%) |
| English | 2 (20%) | 4 (20%) |
| Science | 3 (30%) | 3 (15%) |
| History | 0 | 1 (5%) |
| French | 1 (10%) | 5 (25%) |
| | Total 10 | Total 20 |

Before answering any parts of the question, think about percentages.

Girls:
5% is half of 10%.
35% is 3 lots of 10% + 5%

Boys:
 $\frac{1}{10}$ is 10%.
40% is 4 lots of 10%.

- (a) Which subject did 20% of boys choose?

Read the answer from the table.

English

1 mark

- (b) Which subject did 35% of girls choose?

Read the answer from the table.

Maths

1 mark

- (c) Hakan said: 'In my survey, science was equally popular with boys and girls.'

Explain why Hakan was wrong.

Make comparisons by using *percentages*, not the raw numbers.

Hakan has not taken into account that 3 out of 10 boys like science and 3 out of 20 girls like science.

or

30% of the boys like science but only 15% of the girls like science.

1 mark

- (d) Which subject was equally popular with boys and girls?

Again, make comparisons by using percentages.

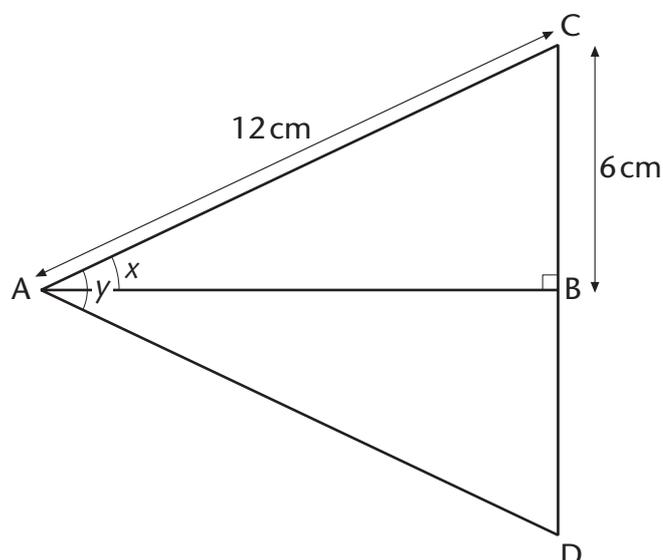
English

1 mark

Triangles

Look at the diagram.

Triangle ABD is the reflection of triangle ABC in the line AB.



Not drawn accurately

Fill in the gaps below to explain how to find angle x .

The length of AC is 12 cm.

The length of AD is 12 cm.

The length of CD is 12 cm.

ACD is an equilateral triangle because

all sides are equal.

1 mark

So angle y is 60° because

each angle in an equilateral triangle is 60° .

1 mark

So angle x is 30° because

it is half of y .

1 mark

It is not enough to write: 'The three angles of a triangle add up to 180° '. You must explain that they are all the same.

You need to know that all sides of an equilateral triangle are equal.

Mental questions

- 1 What is the square root of eighty-one?

What number multiplied by itself equals 81?

9

- 2 I have a fair six-sided dice, with faces numbered one to six. I roll the dice. What is the probability that I roll a number less than five?

There are four numbers less than 5: 1, 2, 3 and 4.

$\frac{4}{6}$ or $\frac{2}{3}$

- 3 Look at this expression. $6ab$
Double it.

$6ab + 6ab = 12ab$ or $2 \times 6ab = 12ab$

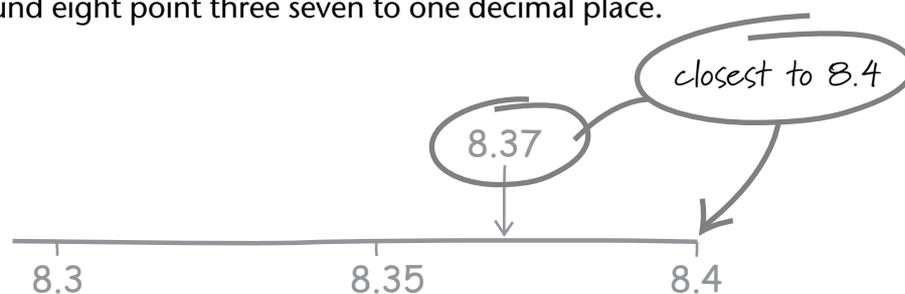
$12ab$

- 4 Write two-fifths as a decimal.

$\frac{2}{5} = \frac{4}{10} = 0.4$

0.4

- 5 Round eight point three seven to one decimal place.



8.4

Trip (non-calculator paper)

- (a) A football club is planning a trip. The club hires 234 coaches. Each coach holds 52 passengers.

How many passengers is that altogether?
Show your working.

Use the grid method to answer this problem.

| | | | |
|----|-------|------|-----|
| | 200 | 30 | 4 |
| 50 | 10000 | 1500 | 200 |
| 2 | 400 | 60 | 8 |

$$\begin{array}{r}
 10000 \\
 1500 \\
 200 \\
 400 \\
 60 \\
 8 \\
 \hline
 12168
 \end{array}$$

Keep the numbers in their correct columns before adding.

12168 passengers

2 marks

- (b) The club wants to put one first aid kit into each of the 234 coaches. These first aid kits are sold in boxes of 18.

How many boxes does the club need?

Use chunking.

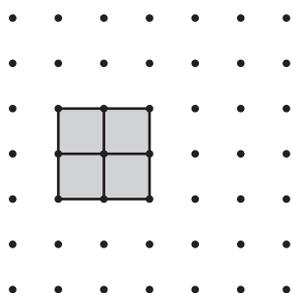
$$\begin{array}{r}
 234 \div 18 \\
 \underline{234} \\
 - 180 \quad 10 \times 18 \\
 \hline
 54 \\
 - 54 \quad 3 \times 18 \\
 \hline
 0
 \end{array}$$

13 boxes

1 mark

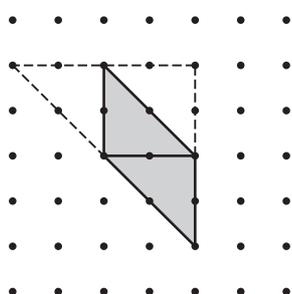
Growing shapes

Four squares join together to make a bigger square.



- (a) Four congruent triangles join together to make a bigger triangle. Draw two more triangles to complete the drawing of the bigger triangle.

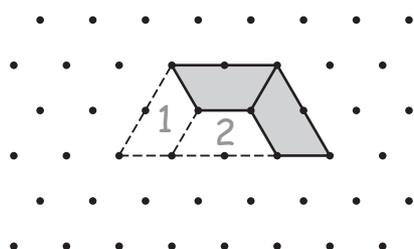
This is one solution, but not the only one. There are others.



'Congruent' means 'identical'.

1 mark

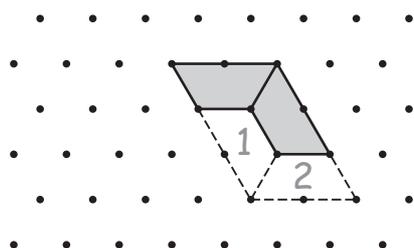
- (b) Four congruent trapeziums join together to make a bigger trapezium. Draw two more trapeziums to complete the drawing of the bigger trapezium.



The trapeziums must be the same size and shape as these.

1 mark

- (c) Four congruent trapeziums join together to make a parallelogram. Draw two more trapeziums to complete the drawing of the parallelogram.



1 mark

Mental questions

- 1 How many faces has a cube?

6

- 2 When m equals three, what is the value of $3m$?

$$3m = 3 \times m, \text{ so } 3 \times 3 = 9$$

9

- 3 How many pints are about the same as one litre?
Ring the best answer.

1 **2** 3 4 5 $1\frac{3}{4}$ pints is about 1 litre, so ring the 2.

- 4 Look at the equation. $y = 2x + 6$
When y equals twenty-six, what is the value of x ?

$$26 = 2x + 6$$

$$\text{so } 2x = 20$$

$$x = 10$$

10

- 5 The scale on my map is four centimetres to one kilometre.
On the map the distance to the rail station is twenty centimetres.
How many kilometres is it to the rail station?

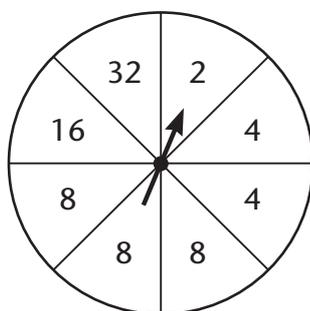
4 cm to 1 km

$$\begin{array}{ccc} \times 5 & \downarrow & \downarrow & \times 5 \\ & 20 \text{ cm} & 5 \text{ km} & \end{array}$$

5 km

Spinning

(a) A spinner has eight equal sections.



Each section is the same size so each has an equal probability of occurring.

What is the probability of scoring 4 on the spinner?

$$\frac{\text{Number of sections containing 4}}{\text{Total number of sections}} = \frac{2}{8} = \frac{1}{4}$$

1 mark

What is the probability of scoring an even number on the spinner?

$$\frac{\text{Number of sections containing even numbers}}{\text{Total number of sections}} = \frac{8}{8} = 1$$

1 mark

$\frac{2}{3}$ is equivalent to $\frac{4}{6}$, so four even numbers are on the spinner.

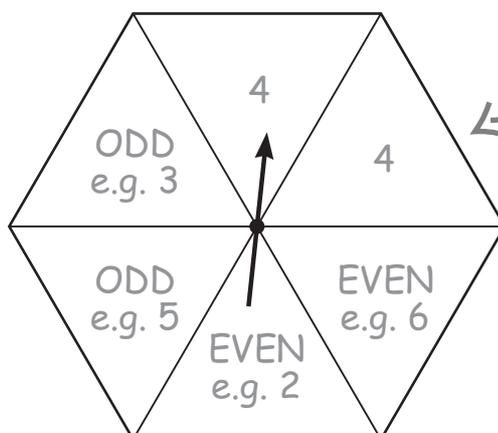
(b) A different spinner has six equal sections and six numbers.

On this spinner, the probability of scoring an even number is $\frac{2}{3}$.

The probability of scoring 4 is $\frac{1}{3}$.

Write what numbers could be on this spinner.

$\frac{1}{3}$ is equivalent to $\frac{2}{6}$, so two sections contain the number 4 on the spinner.



Two sections should be marked number 4, two others with even numbers and another two with odd numbers.

2 marks

Travel (non-calculator paper)

- (a) I pay £16.20 to travel to work each week.
I work for 45 weeks each year.

How much do I pay to travel to work each year?
Show your working.

$$16.20 \times 10 = 162$$

$$\text{so } 16.20 \times 40 = 4 \times 162$$

$$162 \rightarrow 324 \rightarrow 648$$

$$16.20 \times 5 \text{ is half of } 162, \text{ or } 81$$

$$\text{So } 16.20 \times 45 = 648 + 81 = 729$$

You must show your working, but you can do the calculations in any way you choose!

Double and double again to get $\times 4$

A traditional long multiplication is often least successful.

or

$$\begin{array}{r} 45 \\ \times 16 \\ \hline 450 \\ 270 \\ \hline 720 \end{array}$$

$$\begin{array}{r} 45 \\ \times 20\text{p} \\ \hline 900\text{p} = \text{£}9 \\ \text{£}720 + \text{£}9 = \text{£}729 \end{array}$$

$$\underline{\text{£}729}$$

2 marks

- (b) I could buy one season ticket that would let me travel for all 45 weeks.
It would cost £630.

How much is that per week?

$$\text{£}630 \div 45$$

$$45 \times 10 = 450$$

$$45 \times 2 = 90$$

$$45 \times 2 = 90$$

$$\text{So } 630 \div 45 = 10 + 2 + 2 = 14$$

or

$$\begin{array}{r} 45 \overline{)630} \\ - 450 \\ \hline 180 \\ - 90 \\ \hline 90 \\ - 90 \\ \hline 0 \end{array}$$

$$10 \times 45 = 450$$

$$2 \times 45 = 90$$

$$2 \times 45 = 90$$

or

$$630 \div 90 \text{ is } 7$$

$$\text{so } 630 \div 45 \text{ is twice as much, or } 14$$

$$\underline{\text{£}14}$$

2 marks

Mental questions

- 1 What is one hundred divided by negative five?

$$100 \div 5 = 20, \text{ so } 100 \div -5 = -20$$

-20

- 2 How many seconds are there in one and a half minutes?

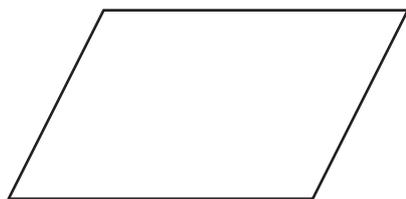
$$1 \text{ minute} = 60 \text{ seconds}$$

$$+\frac{1}{2} \text{ minute} = 30 \text{ seconds}$$

$$\text{Total: } 90 \text{ seconds}$$

90 seconds

- 3 How many pairs of parallel sides does a parallelogram have?



2

- 4 In a quiz, I got eighteen out of twenty questions correct. What percentage of the questions did I get correct?

$$\frac{18}{20} \longrightarrow \frac{90}{100}$$

90%

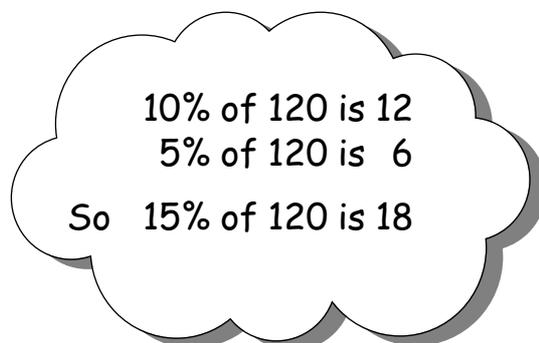
- 5 Write down a number that is both a multiple of four and a multiple of six.

4 8 (12) 16 20 (24) 28 32 (36) 40 44 (48)
6 (12) 18 (24) 30 (36) 42 (48)

12 or 24 or 36 or 48 or ...

Headwork

This is how Caryl works out 15% of 120 in her head.



(a) Show how Caryl can work out $17\frac{1}{2}\%$ of 240 in her head.

5% is half of 10%.

$2\frac{1}{2}\%$ is half of 5%.

$17\frac{1}{2}\% = 10\% + 5\% + 2\frac{1}{2}\%$

$\frac{10\%}{\quad}$ of 240 is $\frac{24}{\quad}$

$\frac{5\%}{\quad}$ of 240 is $\frac{12}{\quad}$

$\frac{2\frac{1}{2}\%}{\quad}$ of 240 is $\frac{6}{\quad}$

So $17\frac{1}{2}\%$ of 240 is 42

2 marks

(b) Work out 35% of 520.

Show your working.

10% of 520 is 52

30% is $3 \times 10\%$, so 30% of 520 = $3 \times 52 = 156$

5% of 520 is 26

35% of 520 is $156 + 26 = 182$

182

2 marks

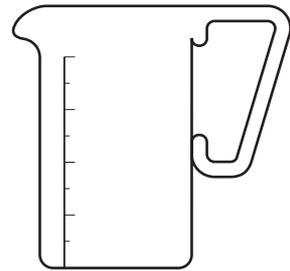
To find 10% of a number, divide the number by 10.

Filling up

I have a measuring jug that holds 400 ml when it is full.

Explain how I can use my measuring jug to obtain 1 litre of water.

I need exactly 1 litre of water.



400ml

$$400 + 400 + 200 = 1000$$

Fill the jug twice, and the third time half fill the jug
- so fill the jug $2\frac{1}{2}$ times.

Remember!
1 litre is 1000 ml.



400ml



400ml



400ml

$2\frac{1}{2}$ jugs

2 marks

Mental questions

- 1 What is the total cost of three books at nine pounds ninety-nine pence each?

£9.99 is 1p less than £10.

$3 \times \text{£}10 = \text{£}30$, then subtract 3p.

£29.97

- 2 A bat flies at an average speed of thirty kilometres per hour. At this speed, how far would it fly in one minute?

30 km in 60 minutes

1 km in 2 minutes

$\frac{1}{2}$ km in 1 minute

0.5 km or $\frac{1}{2}$ km

- 3 Simplify the expression. $3m + 6k + 2m + k$

$$3m + 2m = 5m$$

$$6k + k = 7k$$

$5m + 7k$

- 4 What is the mean of these four numbers? 60 40 10 10

$$(60 + 40 + 10 + 10) \div 4 = 120 \div 4 = 30$$

30

- 5 What is the approximate circumference of a circle with a diameter of one metre?

Circumference = $\pi \times$ diameter

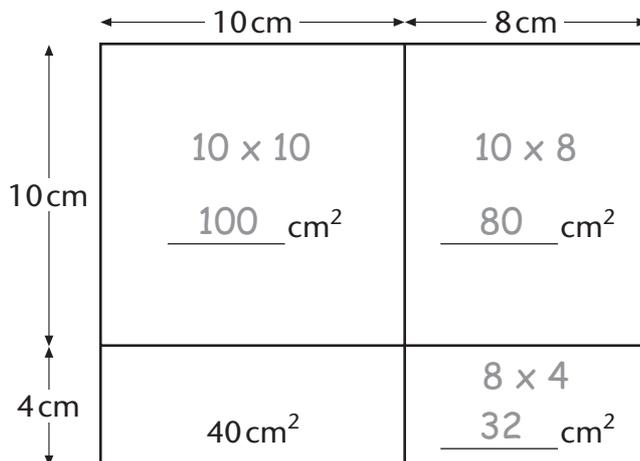
π is about 3. So circumference is about $3 \times 1 = 3$ m

3 m

Areas

The diagram shows a rectangle 18 cm long and 14 cm wide. It has been split into four smaller rectangles.

- (a) Write the area of each small rectangle on the diagram. One has been done for you.



What is the area of the whole rectangle?

$$100 \text{ cm}^2 + 80 \text{ cm}^2 + 40 \text{ cm}^2 + 32 \text{ cm}^2$$

$$\underline{252} \text{ cm}^2$$

1 mark

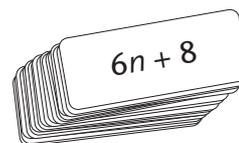
- (b) What is 18×14 ?

$$\underline{252}$$

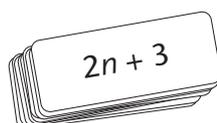
1 mark

Piles of cards

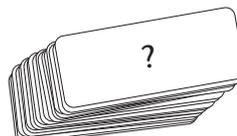
A teacher has a large pile of cards.
An expression for the total number of cards is $6n + 8$.



- (a) The teacher puts the cards in two piles.
The number of cards in the first pile is $2n + 3$.



first pile



second pile

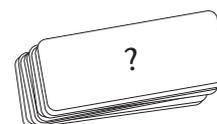
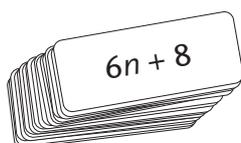
Write an expression to show the number of cards in the second pile.

$$6n - 2n = 4n \text{ and } 8 - 3 = 5, \text{ so } 4n + 5$$

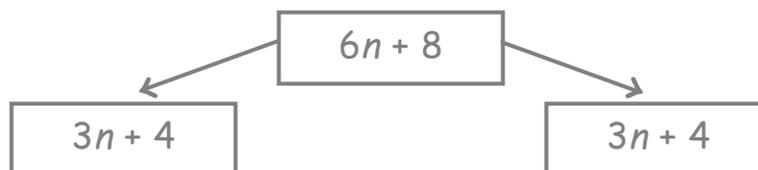
$$\underline{4n + 5}$$

1 mark

- (b) The teacher puts all the cards together.
Then he uses them to make two equal piles.



Write an expression to show the number of cards in one of the piles.

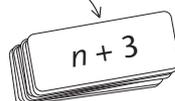


$$\underline{3n + 4}$$

1 mark

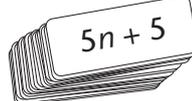
- (c) The teacher puts all the cards together again, then he uses them to make two piles, one with $n + 3$ cards and the other with $5n + 5$.
There are 23 cards in the first pile.

23 cards



first pile

? cards



second pile

Step 1
Find the value of n .

How many cards are in the second pile?
Show your working.

$$n + 3 = 23 \text{ so } n = 20$$

Substitute into $5n + 5$.

$$5 \times 20 + 5 = 100 + 5 = 105$$

$$\underline{105}$$

Step 2
Substitute the value of n .
If $n = 20$, then
 $5n = 5 \times n = 5 \times 20$.

1 mark

Mental questions

- 1 How many millimetres are there in nine centimetres?

$$1 \text{ cm} = 10 \text{ mm, so } 9 \text{ cm} = 90 \text{ mm}$$

90 mm

- 2 A lesson starts at nine fifty and finishes at ten fifteen.
How long is the lesson in minutes?

$$9:50 \longrightarrow 10:00 \text{ is } 10 \text{ minutes}$$

$$10:00 \longrightarrow 10:15 \text{ is } 15 \text{ minutes}$$

$$10 + 15 = 25 \text{ minutes}$$

25 minutes

- 3 I buy a book costing one pound forty-five.
What change should I get from a five pound note?

$$£1.45 \text{ is } 5\text{p less than } £1.50.$$

$$£5.00 - £1.50 = £3.50$$

$$\text{So } £3.55$$

£3.55

- 4 Add together sixty-five and fifty-eight.

$$65 + 58 \longrightarrow 60 + 50 = 110$$

$$5 + 8 = 13$$

123

- 5 One magazine costs one pound ninety-five.
What will be the cost of five of these magazines?

$$£1.95 \times 5 \quad £2 \times 5 = £10$$

$$5\text{p} \times 5 = 25\text{p}$$

$$\text{So } £10 - 25\text{p} = £9.75$$

£9.75

Dropping litter (1)

Why do the pupils think it will be lower than 93%?

This advert was in a newspaper.

It does not say how the advertisers know that 93% of people drop litter every day.

Some pupils think the percentage of people who drop litter every day is much lower than 93%. They decide to do a survey.

93% of us drop litter every day



Do your bit. Use a bin.

Can you get an answer of 93% if only 10 people are asked?

(a) Jack says: 'We can ask 10 people if they drop litter every day.'

Give two different reasons why Jack's method might not give very good data.

First reason

Jack might ask only children or only older people, so it would not be representative.

or

The sample size is too small - need to ask more people.

1 mark

Second reason

They did not drop litter because there were lots of bins.

or

People did not tell the truth about dropping litter.

1 mark

Is the age of the people asked important? Do you need a cross-section?

Is 10 a good sample size?

Is location important? What if the survey was in an area with lots of bins? In an area without bins?

Are people always honest? Would you admit to dropping litter?

Dropping litter (2)

(b) Lisa says: 'We can go into town on Saturday morning. We can stand outside a shop and record how many people walk past and how many of those drop litter.'

Give two different reasons why Lisa's method might not give very good data.

First reason

Would the day and time of the survey make a difference?

The sample is not representative because only certain people shop on a Saturday morning.

or

Would the type of shop she stood outside make a difference?

The type of shop might determine how much litter is dropped. For example, there might be more litter outside a take-away where people want to get rid of packaging, but less litter outside a sports shop.

1 mark

Second reason

How will Lisa know who she has counted?

She might count someone twice if they walk past the shop more than once.

or

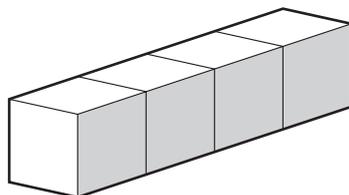
Would you drop litter if someone was watching you?

People might not act the way they usually do if someone is watching them. For example, they may put litter in their pocket when they would normally drop it.

1 mark

Cubes

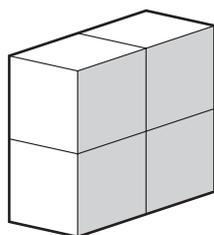
This shape is made from four cubes joined together.



The table shows information about the shape.

| | |
|--------------|-------------------|
| Volume | 4 cm^3 |
| Surface area | 18 cm^2 |

The same four cubes are then used to make this new shape.



Complete the table for the new shape.

| | |
|--------------|-------------------------|
| Volume | <u>4</u> cm^3 |
| Surface area | <u>16</u> cm^2 |

How many cubes?

2 marks

How many square faces
could you see on all sides?
Front 4, back 4, and 8
around the edges,
so $4 + 4 + 8 = 16$

Mental questions

- 1 What is five cubed?

5 cubed means $5 \times 5 \times 5 = 25 \times 5 = 125$

125

- 2 Subtract zero point seven five from six.

$6 - 0.75$

$6 - 1 = 5$, then add on 0.25

5.25

5.25

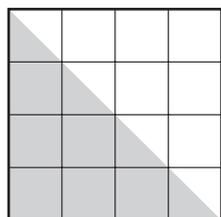
- 3 Twenty-five per cent of a number is seven.
What is the number?

You need to find 100%.

25% is 7, so 50% is 14, and so 100% is 28

28

- 4 Look at this shaded triangle drawn on a square grid.
What is the area of the triangle?



Area of square is $4 \times 4 = 16$ square units.

The triangle is half this,
so its area is 8 square units.

8 square units

- 5 A fair spinner has eight equal sections with a number on each section.
Five of the numbers are even.
Three of the numbers are odd.
What is the probability that I spin an even number?

5 out of 8 are even.

Probability of even number = $\frac{5}{8}$

$\frac{5}{8}$

Do not use words –
write the probability
as a fraction.

Water (calculator paper)

(a) A glass holds 225 ml.

An adult needs about 1.8 litres of water each day to stay healthy. How many millilitres is that?



225 ml

Remember! there are 1000 ml in 1 litre

$$1.8 \times 1000 = 1800 \text{ ml}$$

or 1 litre is 1000 ml.

$$0.8 \text{ litres is } 800 \text{ ml.}$$

So 1.8 litres is $1000 + 800 = 1800 \text{ ml}$.

How many glasses is that?
Show your working.

$$1800 \div 225$$

$$\begin{aligned} 225 \times 2 &= 450 \\ 225 \times 4 &= 900 \\ 225 \times 8 &= 1800 \end{aligned}$$

$$\text{So } 1800 \div 225 = 8$$

or

$$\begin{array}{r} 225 \overline{)1800} \\ \underline{-450} \\ 1350 \\ \underline{-900} \\ 450 \\ \underline{-450} \\ 0 \end{array}$$

$\left. \begin{array}{l} 2 \\ 4 \\ 2 \end{array} \right\} \begin{array}{l} \times 225 = 450 \\ \times 225 = 900 \\ \times 225 = 450 \end{array}$

or

$$\begin{array}{r} 8 \\ 225 \overline{)1800} \end{array}$$

$$\text{So } 1800 \div 225 = 2 + 4 + 2 = 8$$

You can use any of these methods to divide.

8 glasses

2 marks

(b) An adult weighs 80 kg.

60% of his total mass is water.

What is the mass of this water?

10% of 80 kg is 8 kg.

So 60% of 80 kg is $6 \times 8 = 48 \text{ kg}$.

or 60% is $\frac{3}{5}$.

$$\frac{1}{5} \text{ of } 80 = 80 \div 5 = 16$$

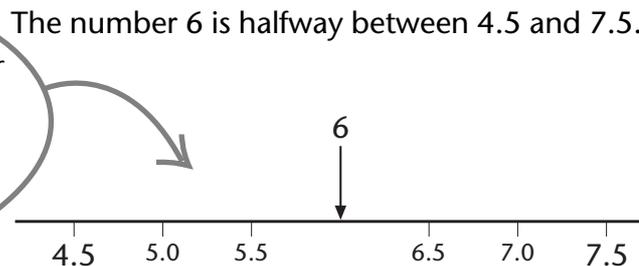
So $\frac{3}{5}$ of 80 is $3 \times 16 = 48$

48 kg

1 mark

Halfway

You could use a number line if this is easier. Put other values on the number line.



Alternatively, find the difference between 6 and 4.5. This tells you what you have to add on to get the higher number, 7.5.

What do you add on to 2.8 to make 6?
 $2.8 + 3.2 = 6$

Fill in the missing numbers below.

The number 6 is halfway between 2.8 and 9.2 1 mark

The number 6 is halfway between -12 and 24 1 mark

Add 3.2 to 6 to find the missing number.
 $6 + 3.2 = 9.2$

Mental questions

- 1 Look at this expression. Simplify it.

$$7a + 2b + 3a + 5b$$

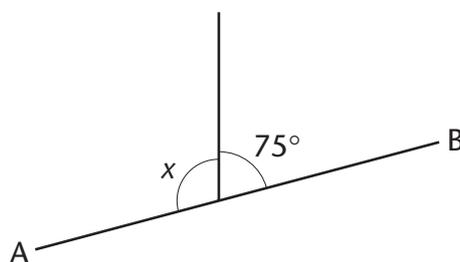
$$2b + 5b = 7b$$

$$7a + 3a = 10a$$

$$10a + 7b$$

$$\underline{10a + 7b}$$

- 2 AB is a straight line. Work out the size of angle x .



$$x + 75^\circ \text{ adds up to } 180^\circ.$$

$$180^\circ - 75^\circ = 105^\circ$$

$$\underline{105^\circ}$$

You need to know this.

- 3 What is the sum of the angles in a triangle?

→ The three angles of a triangle add up to 180° .

$$\underline{180^\circ}$$

- 4 Look at this expression. $2k + 4$
What is the value of the expression when k equals three?

$2k$ means $2 \times k$, so

$$2k + 4 = 2 \times 3 + 4 = 6 + 4 = 10$$

$$\underline{10}$$

- 5 What percentage is the same as the fraction one quarter?

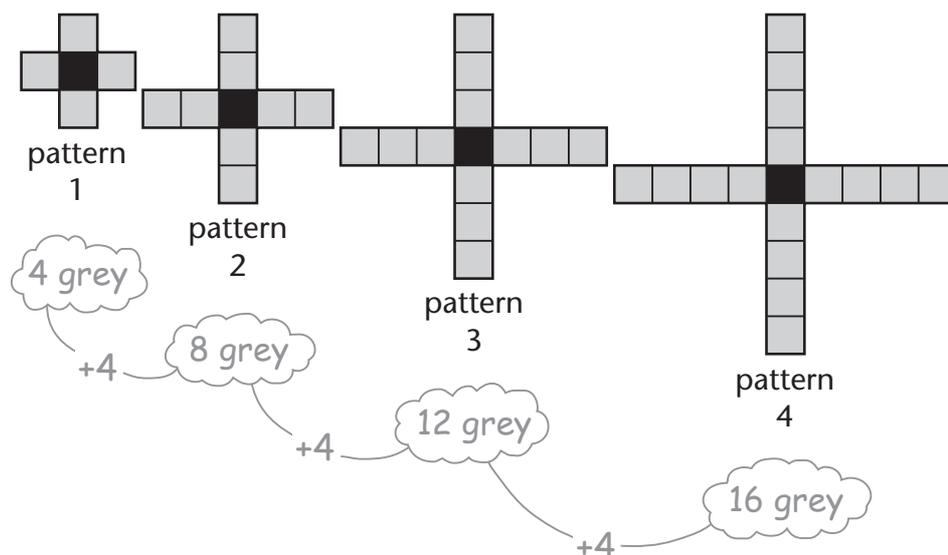
$$\frac{1}{2} = 50\%, \frac{1}{4} = 25\%$$

$$\underline{25\%}$$

Crosses (1)

Steve is making a series of patterns with black and grey square tiles.

- (a) Each pattern has 1 black tile at the centre.
Each new pattern has more grey tiles than the one before.
How many more grey tiles does Steve add each time he makes a new pattern?



4

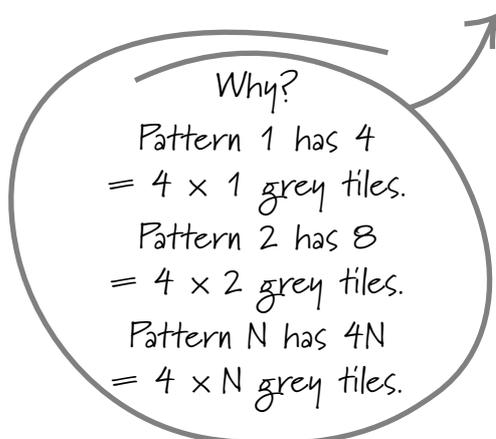
1 mark

- (b) Steve writes:
The rule for finding the number of tiles in pattern N is
number of tiles = $4 \times N + 1$

The 1 in Steve's rule represents the black tile.
What does the $4 \times N$ represent?

The number of grey tiles

1 mark



Crosses (2)

- (c) Steve wants to make pattern 15.
How many black tiles and how many grey tiles does he need?

Always 1 black tile in the centre

Use $4 \times N$ or $4 \times$ pattern number

for the number of grey tiles.

$$4 \times 15 = 60$$

1 black and 60 grey tiles

1 mark

- (d) Steve uses 41 tiles altogether to make a pattern.
What is the number of the pattern he makes?

Take 1 from 41 as each pattern always has 1 black tile in the centre.

This leaves 40 for the grey tiles. There are 4 arms, so there are 10 tiles for each arm. So this is pattern 10.

Pattern 10

1 mark

- (e) Steve has 12 black and 80 grey tiles.
What is the number of the biggest pattern Steve can make?

Whatever pattern Steve makes, he only needs 1 black tile.

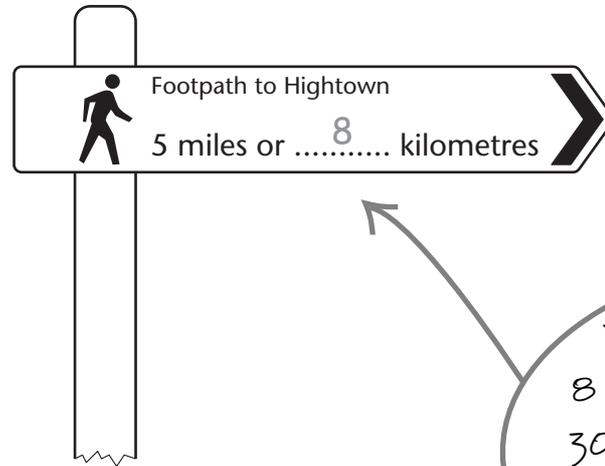
80 grey divided among 4 arms gives 20 tiles for each arm, so pattern 20 is the biggest pattern Steve can make.

Pattern 20

1 mark

Sign

How many kilometres are there in 5 miles?
Complete the missing part of the sign.



You need to know:
8 km is about 5 miles
30 cm is about 1 foot
 $2\frac{1}{2}$ cm is about 1 inch

1 mark

Mental questions

- 1 Multiply zero point two by zero point three.

$$2 \times 3 = 6, 0.2 \times 3 = 0.6, 0.2 \times 0.3 = 0.06$$

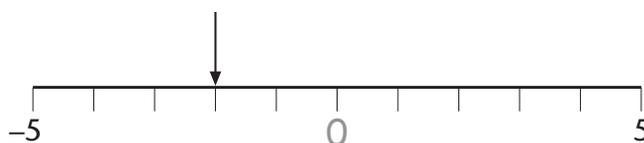
0.06

- 2 Double seventy-eight.

$$70 \times 2 = 140, 8 \times 2 = 16, \text{ so } 78 \times 2 = 140 + 16 = 156$$

156

- 3 What number does the arrow point to on the number line?



Find where zero is and mark it in.

-2

- 4 There are red, blue and yellow balls in a bag. I am going to take out one ball at random. The table shows the probability of it being a red ball and the probability of it being a blue ball. What is the probability of it being a yellow ball?

| | | |
|-----|------|--------|
| red | blue | yellow |
| 0.2 | 0.5 | 0.3 |

All three probabilities add up to 1, so $0.7 + ? = 1$

0.3

- 5 One of the numbers below is the decimal equivalent of one eighth. Ring it.

0.125 0.18 0.215 0.8 1.8

$$\frac{1}{4} = 0.25$$

$\frac{1}{8}$ is $\frac{1}{2}$ of this.

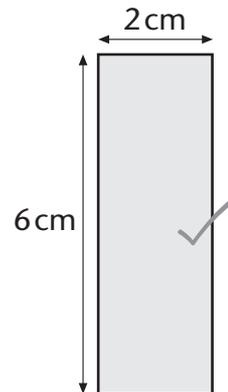
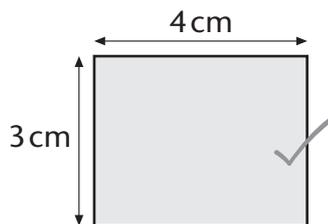
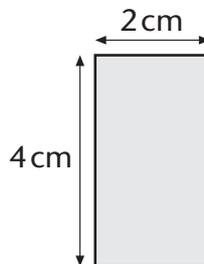
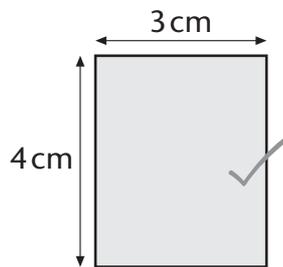
0.125

0.125

Areas

(a) Tick (✓) any rectangles below that have an area of 12 cm^2 .

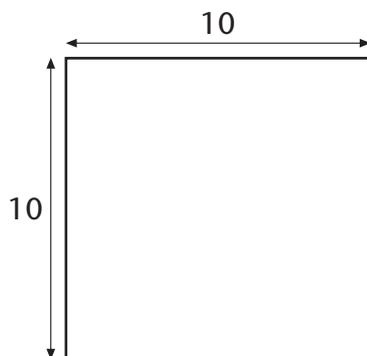
Length \times width
must equal 12.



1 mark

(b) A square has an area of 100 cm^2 .
What is its perimeter?
Show your working.

As area is 100 cm^2
this is a 10×10
square.



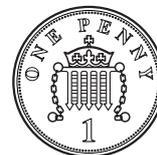
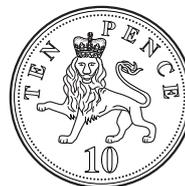
$$\text{Perimeter} = 10 + 10 + 10 + 10$$

$$\underline{\quad 40 \quad} \text{ cm}$$

1 mark

Coins

(a) Jo has these 4 coins.



Jo is going to take one of these coins at random.
Each coin is equally likely to be the one she takes.

Show that the probability that it will be a 10p coin is $\frac{1}{2}$.

Out of 4 coins, 2 are 10p coins, so the probability of a 10p coin is $\frac{2}{4} = \frac{1}{2}$.

$$\frac{1}{2}$$

1 mark

(b) Colin has 4 coins that total 33p.
He is going to take one of his coins at random.

What is the probability that it will be a 10p coin?
You must show your working.

20p, 10p, 2p, 1p

This time 1 of the 4 coins is 10p, so the probability of a 10p coin is $\frac{1}{4}$.

$$\frac{1}{4}$$

1 mark

Do **not** use words such as '2 out of 4' or '1 in 2' for your answers.

Write down what the 4 coins are.