

## Mental Arithmetic Questions

1. What number is five cubed?

.....

2. A circle has radius  $r$ .

What is the formula for the area of the circle?

.....

3. Jenny and Mark share some money in the ratio two to three. Jenny's share is one hundred and ten pounds. How much is Mark's share?

.....

4. The net of a triangular prism is made from triangles and rectangles. How many of each shape are needed?

.....

5. Multiply minus six by minus two.

.....

## Advert

You can work out the cost of an advert in a newspaper by using this formula:

<b><math>C = 15n + 75</math></b>	<b>C</b> is the cost in pounds
	<b>n</b> is the number of words in the advert

- (a) An advert has **18 words**.

Work out the cost of the advert.

Show your working.



£
---

2 marks

- (b) The cost of an advert is **£615**

How many words are in the advert?

Show your working.



..... words

2 marks

## Toys

The cost of an old toy vehicle depends on its condition and on whether it is in its original box.

Condition	Value
excellent, and in its box	100%
good, and in its box	85%
poor, and in its box	50%
excellent, but not in its box	65%
good, but not in its box	32%
poor, but not in its box	15%

A Mail Van in excellent condition, and in its original box, costs **£125**.

- (a) How much is a Mail Van in **good** condition, and in its box?



£ .....

1 mark

- (b) How much is a Mail Van in **good** condition, **but not in its box**?

- (c) A Petrol Tanker in excellent condition, and in its box, costs £152.

Another Petrol Tanker should be sold for £98.80

Using the chart above, what is its condition and does it have a box?

## Mental Arithmetic Questions

**KS3 MATHEMATICS**

**10 4 10**

Level 6 Questions

**Day 2**

1. What is one third of three-quarters of one hundred?  
.....
2. I'm thinking of a number. I call it  $n$ .  
I square my number then add four.  
Write an expression to show the result.  
.....
3. Twenty-one out of thirty-six pupils said they watched Top of the Pops.  
What angle would show this on a pie chart?  
.....
4. There are seven red and three blue balls in a bag.  
I am going to take a ball out of the bag at random. What is the probability that the ball will be blue?  
.....
5. Write a multiple of three that is bigger than one hundred.  
.....

## Area

The information in the box describes three different squares, A, B and C.

The **area** of square A is **36 cm<sup>2</sup>**  
 The **side length** of square B is **36 cm**  
 The **perimeter** of square C is **36 cm**

Put squares A, B and C in order of size, starting with the smallest.  
 You **must** show calculations to explain how you work out your answer.

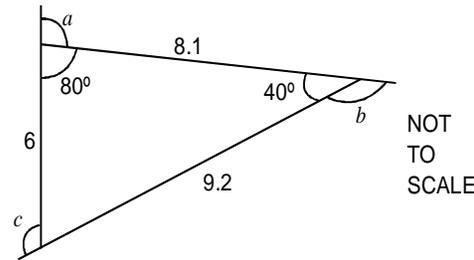
.....  
 smallest ..... largest

2 marks

## Angles

Kay is drawing shapes on her computer. She wants to draw this triangle. She needs to know angles

*a*, *b* and *c*.



Calculate angles *a*, *b* and *c*.

*a* = .....<sup>o</sup>

1 mark

*b* = .....<sup>o</sup>

*c* = .....<sup>o</sup>

1 mark

(b) Kay draws a rhombus:

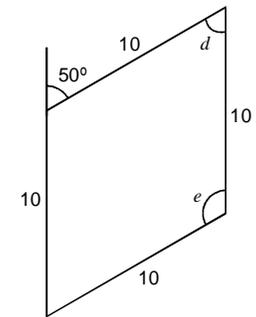
Calculate angles *d* and *e*.

*d* = .....<sup>o</sup>

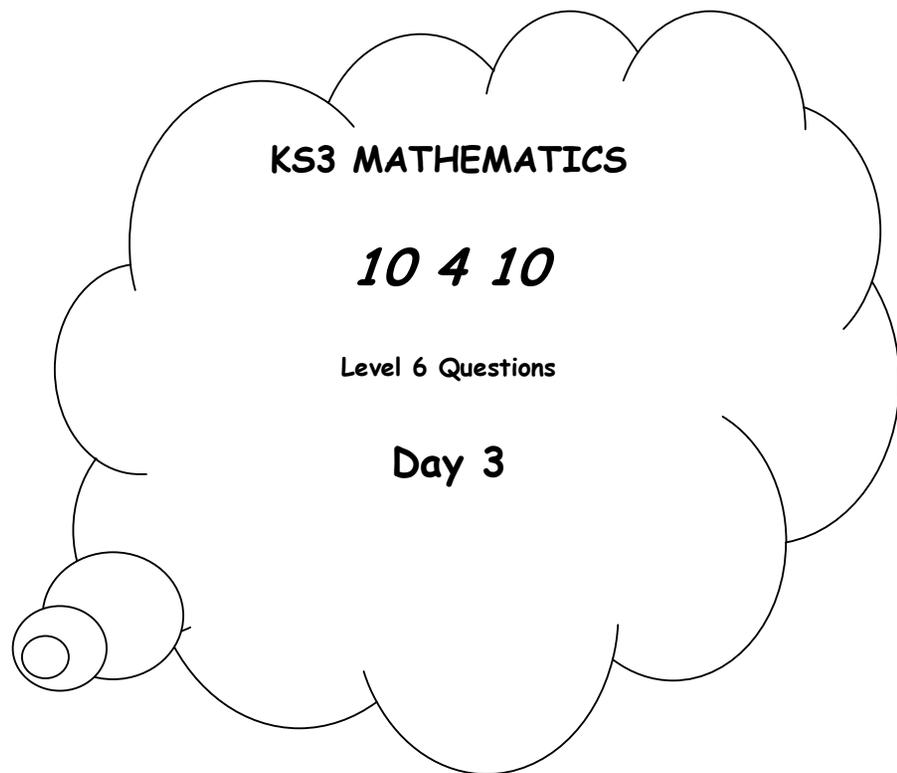
1 mark

*e* = .....<sup>o</sup>

1 mark



NOT  
TO  
SCALE



## Mental Arithmetic Questions

1. I am thinking of a number. I call it  $n$ .  
I double my number then I subtract three.  
Write an expression to show the result.

.....

2. What percentage of fifty pounds is thirty-five pounds?

.....

3. On average, the driest place on earth gets only nought point five millimetres of rain every year.  
In total, how much rain would it expect to get in twenty years?

.....

4. To the nearest whole number, what is the square root of eighty-three point nine?

.....

5. It takes me one and a half minutes to swim one length of the pool.  
How many lengths can I swim in fifteen minutes

.....

## Sheep and Lambs

On a farm **80** sheep gave birth.

**30%** of the sheep gave birth to two lambs.

The rest of the sheep gave birth to just one lamb.

In total, how many lambs were born?

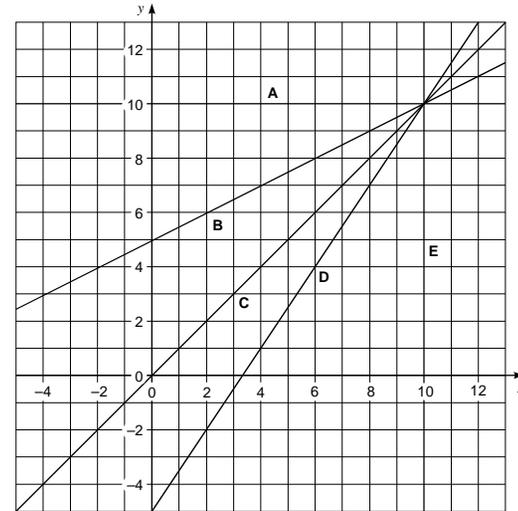
Show your working.

..... Lambs

2 marks

## Equations

These straight line graphs all pass through the point (10, 10)



(a) Fill in the gaps to show which line has which equation.

line ..... has equation  $x = 10$

line ..... has equation  $y = 10$

line ..... has equation  $y = x$

line ..... has equation  $y = \frac{3}{2}x - 5$

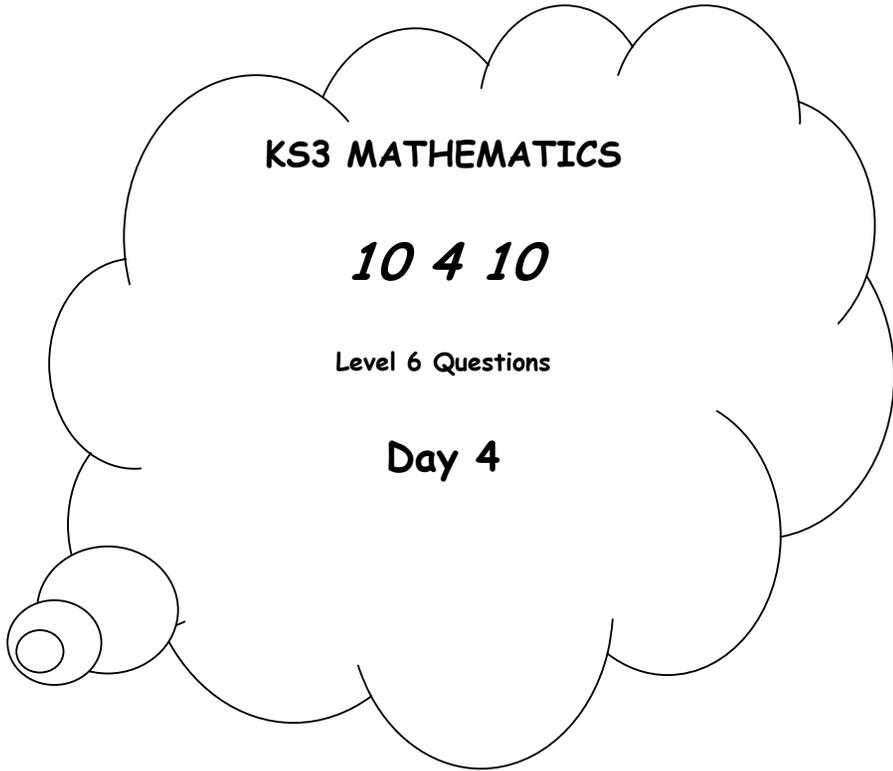
line ..... has equation  $y = \frac{1}{2}x + 5$

2 marks

b) Does the line that has the equation  $y = 2x - 5$  pass through the point (10, 10)?

Explain how you know.

1 mark



### Mental Arithmetic Questions

1. Tariq won one hundred pounds in a maths competition. He gave two-fifths of his prize money to charity. How much of his prize money, in pounds, did he have left?

.....

2. What is three point nine divided by two?

.....

3. The instructions for a fruit drink say to mix one part blackcurrant juice with four parts water. I want to make one litre of this fruit drink. How much blackcurrant juice should I use? Give your answer in millilitres.

.....

4. What is half of two-thirds?

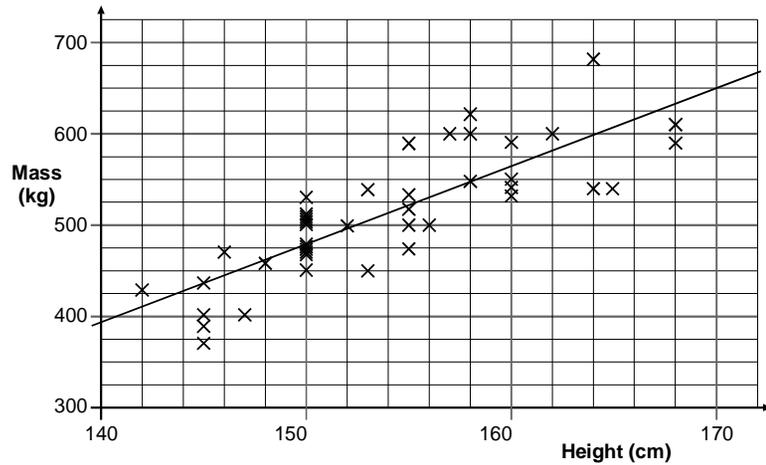
.....

5. The population of the United Kingdom is about fifty-nine million. Write this number in figures.

.....

## Horses

The scatter diagram shows the heights and masses of some horses. The scatter diagram also shows a line of best fit.



(a) What does the scatter diagram show about the **relationship** between the height and mass of horses?

1 mark

(b) The **height** of a horse is **163cm**.  
Use the line of best fit to estimate the mass of the horse.

..... kg

1 mark

(c) A different horse has a **mass of 625kg**.  
Use the line of best fit to estimate the height of the horse.

..... cm

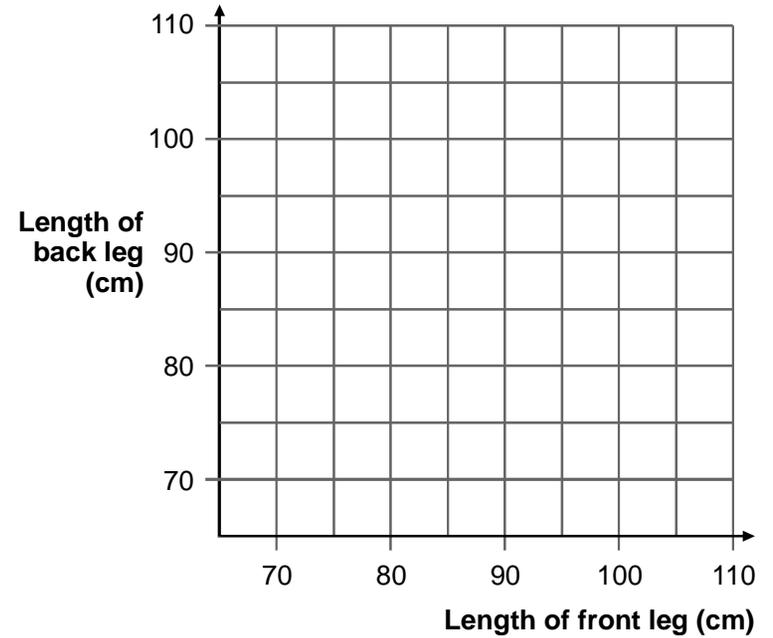
1 mark

(d) A teacher asks his class to investigate this statement:

"The length of the **back leg** of a horse is **always**

**less than** the length of the **front leg** of a horse."

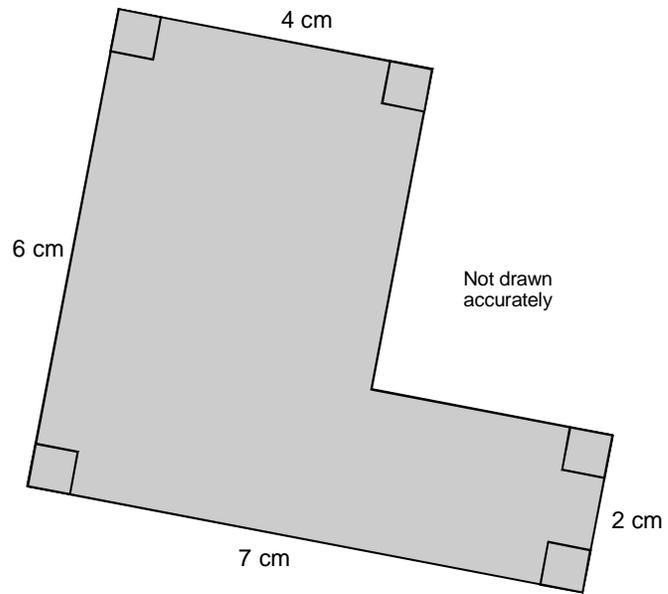
What might a scatter graph look like if the statement is correct? Use the axes below to show your answer.



1 mark

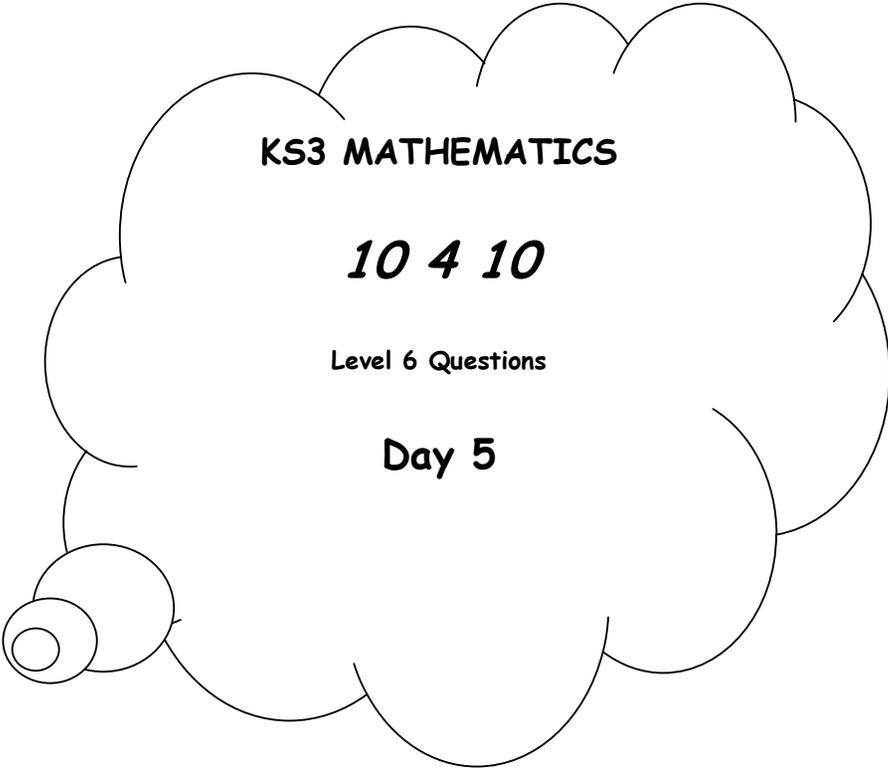
### L-shape

What is the area of this L-shape?  
Show your working.



..... cm<sup>2</sup>

2 marks



**KS3 MATHEMATICS**

**10 4 10**

Level 6 Questions

**Day 5**

**Mental Arithmetic Questions**

1. What is three-fifths of forty pounds?

.....

2. The longest bone in the human body is in the leg. The average length of this bone in a man is fifty centimetres. In a woman it is ten per cent less. What is the average length of this bone in a woman?

.....

3. Using three as an approximation for pi, what is the area of a circle with radius five centimetres?

.....

4. I am thinking of a two-digit number that is a multiple of eight. The digits add up to six. What number am I thinking of?

.....

5. I am thinking of a number. I call it  $n$ . I add five to my number. Write an expression to show the result.

.....

## Fractions

(a) Add  $\frac{6}{10}$  and  $\frac{6}{5}$

 .....

1 mark

Now use an arrow ( $\downarrow$ ) to show the result on the number line.



(b) How many **sixths** are there in  $3\frac{1}{3}$ ?

 .....

1 mark

(c) Work out  $3\frac{1}{3} \div \frac{5}{6}$

Show your working.

 .....

1 mark

## Puzzle

You can often use algebra to show why a number puzzle works.

Fill in the missing expressions.

Example:

5

Think of a number

Algebra:

$n$

9

Add 4

$n + 4$

14

Now add the number you were first thinking of



1 mark

7

Divide by 2



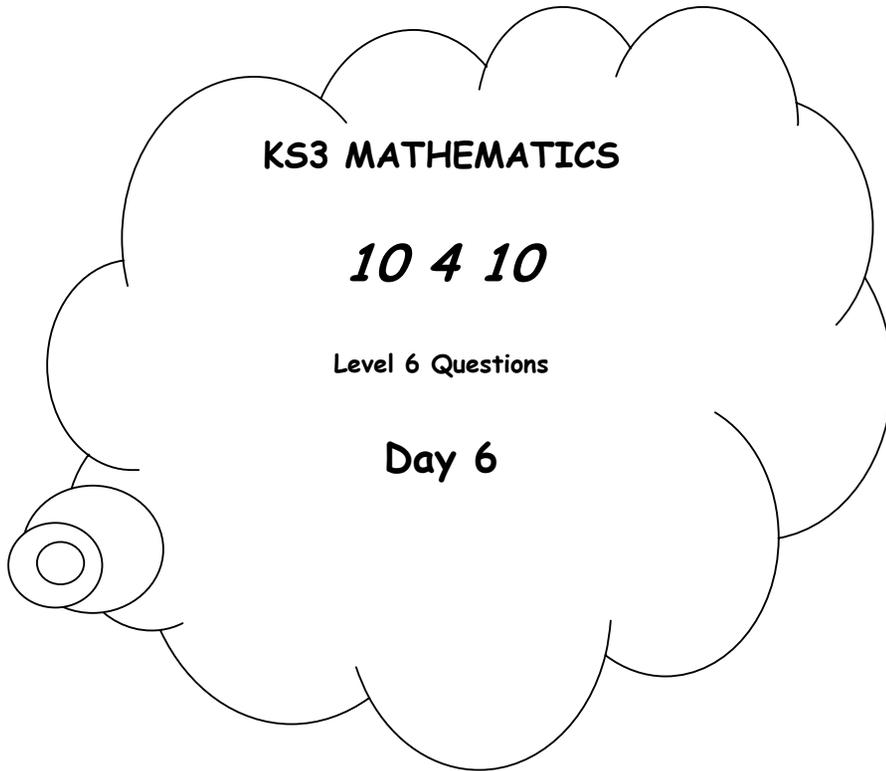
5

Subtract 2



The answer is the number you were first thinking of

2 marks



## Mental Arithmetic Questions

1. Five percent of a number is 8. What is the number?  
.....
2. A fair spinner has eight equal sections with a number on each section. Five of them are even numbers. Three are odd numbers. What is the probability that I spin an even number?  
.....
3. I can make a three-digit number from the digits two, three and four in six different ways. How many of these three-digit numbers are even?  
.....
4. What is the volume of a cuboid measuring five centimetres by six centimetres by seven centimetres?  
.....
5. What is the remainder when you divide three hundred by twenty-nine?  
.....

## Wheelchair

Wyn and Jay are using their wheelchairs to measure distances.



- (a) The large wheel on **Wyn's** wheelchair has a **diameter** of **60cm**.  
Wyn pushes the wheel round **exactly** once.

Calculate how far Wyn has moved.

Show your working.

..... cm

2 marks

- (b) The large wheel on **Jay's** wheelchair has a **diameter** of **52cm**.

Jay moves her wheelchair forward **950cm**.

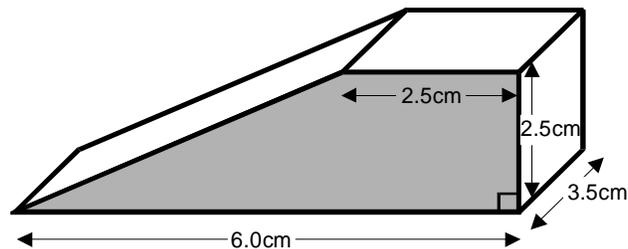
Calculate how many times the large wheel goes round. Show your working.

..... Times

2 marks

## Wedges

This door wedge is the shape of a prism.



NOT TO SCALE

- (a) The shaded face of the door wedge is a trapezium.

Calculate the area of the shaded face.

Show your working.

..... cm<sup>2</sup>

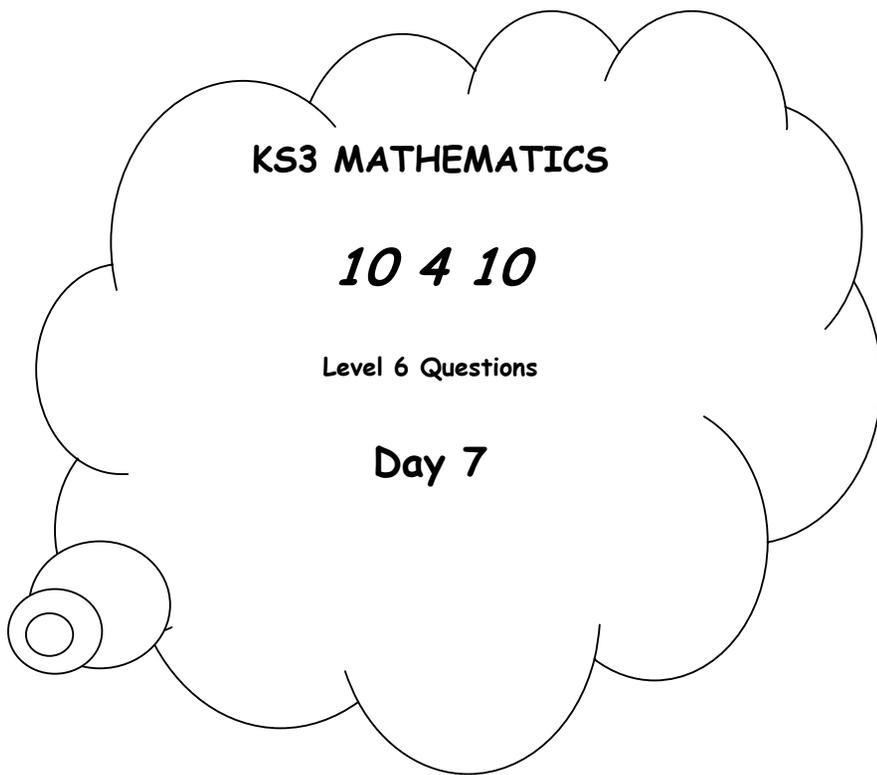
2 marks

- (b) Calculate the volume of the door wedge.

Show your working.

..... cm<sup>3</sup>

1 mark



## Mental Arithmetic Questions

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

.....

2. There are fourteen girls and thirteen boys in a class.  
What is the probability that a pupil chosen at random will be a girl?

.....

3. The first even number is two.  
What is the hundredth even number?

.....

4. The mean of two numbers is 8. One of the numbers is two. What is the other number?

.....

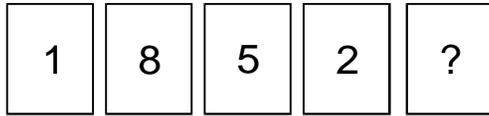
5. How many edges are there on a square based pyramid?

.....

## Number Cards

James has these four number cards:

The **mean** is 4.



James takes another card.

The mean of the **five** cards is still 4. What number is on his new card?

..... 1 mark

(b) Tara has these four number cards:



She takes another card. The mean goes **up** by 2. What number is on her new card?

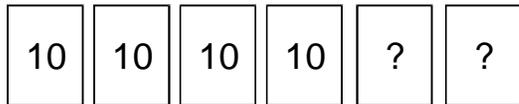


Show your working.

.....2 marks

(c) Ali has six cards. The **mean** of the six cards is 10. The **range** of the six cards is 4.

What are the numbers on the other two cards?

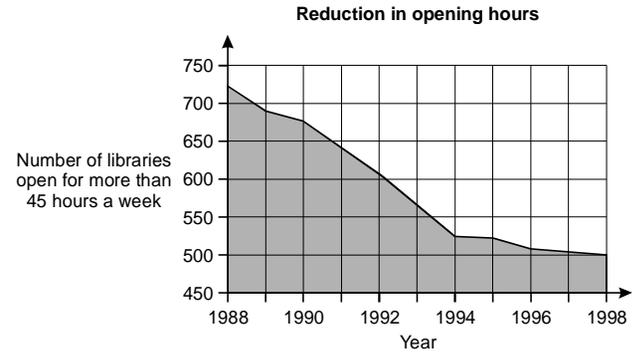


..... and  
.....

1 mark

## Libraries

A newspaper wrote an article about public libraries in England and Wales. It published this diagram.



Data on libraries from LISU (Library and Information Statistics Unit)

Use the **diagram** to decide whether each statement below is true or false, or whether you cannot be certain.

(a) The number of libraries open for more than 45 hours per week **fell by more than half** from 1988 to 1998.

True

False

Cannot be certain

Explain your answer.

1 mark

(b) **In 2004** there will be **about 450 libraries** open in England and Wales for more than 45 hours a week.

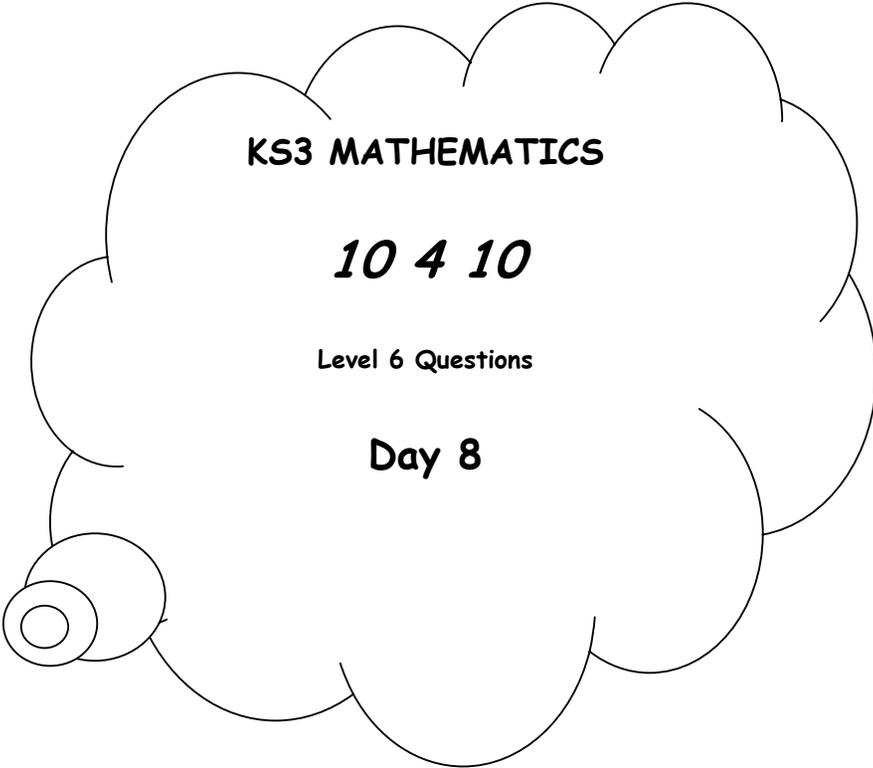
True

False

Cannot be certain

Explain your answer.

1 mark



**KS3 MATHEMATICS**

**10 4 10**

Level 6 Questions

**Day 8**

## Mental Arithmetic Questions

1. Multiply 8.7 by 2

.....

2. A bat flies at an average speed of 32 kilometres an hour. At this speed, how far will it fly in 15 minutes?

.....

3. Multiply the brackets  $(2x + 1)(x - 1)$

.....

4. I'm thinking of a number. I call it  $t$ . I half it and subtract five. Write an expression to show the result.

.....

5. The first odd number is 1. What is the hundredth odd number?

.....

## Equations

Solve these equations.  
Show your working.

$$8k - 1 = 15$$

$$k = \dots\dots\dots$$

1 mark

$$2m + 5 = 10$$

$$m = \dots\dots\dots$$

1 mark

$$3t + 4 = t + 13$$

$$t = \dots\dots\dots$$

2 marks

$$2(3n + 7) = 8$$

$$n = \dots\dots\dots$$

1 mark

## Sibling ages

Paul is 14 years old.

His sister is exactly **6 years younger**, so this year she is 8 years old.

This year, the ratio of Paul's age to his sister's age is 14 : 8

14 : 8 written as simply as possible is **7 : 4**

- (a) When Paul is **21**, what will be the ratio of Paul's age to his sister's age?

Write the ratio as simply as possible.



..... : .....

1 mark

- (b) When his sister is **36**, what will be the ratio of Paul's age to his sister's age?

Write the ratio as simply as possible.



..... : .....

1 mark

- (c) Could the ratio of their ages ever be **7 : 7**?

Tick (✓) Yes or No.



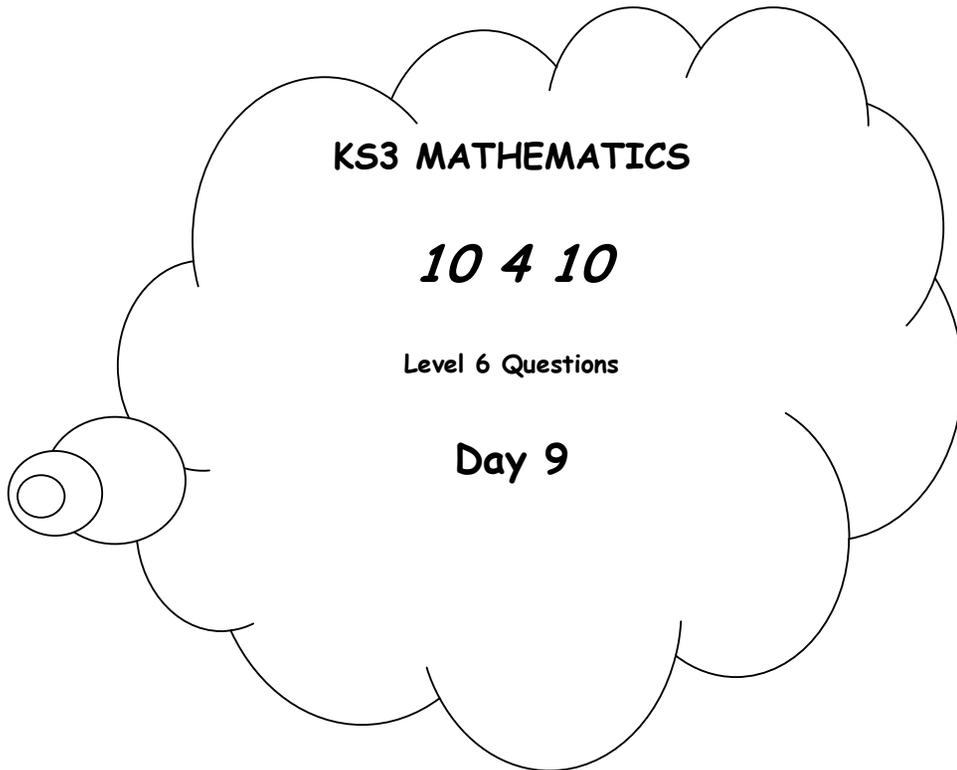
Yes

No

Explain how you know.



1 mark



## Mental Arithmetic Questions

1. Add four to minus five.

.....

2. What number should you add to minus three to get the answer five?

.....

3. How many nought point fives are there in ten?

.....

4. On average, the driest place on earth gets only nought point five millimetres of rain every year. In total, how much rain would it expect to get in twenty years?

.....

5. What is the sum of the angles in a rhombus?

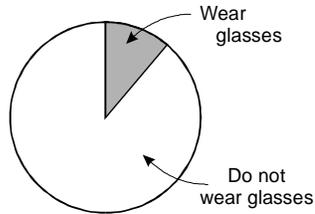
.....

## Glasses

There are **60 pupils** in a school.

**6** of these pupils wear glasses.

- (a) The pie chart is not drawn accurately.



What should the angles be?  
Show your working.

..... ° and ..... °

2 marks

- (b) Exactly **half** of the 60 pupils in the school are boys.

From this information, what **percentage of boys** in this school **wear glasses**?

Tick (✓) the correct box below.

5%	<input type="checkbox"/>	6%	<input type="checkbox"/>	10%	<input type="checkbox"/>	<input type="checkbox"/>
20%	<input type="checkbox"/>	50%	<input type="checkbox"/>	not possible to tell	<input type="checkbox"/>	<input type="checkbox"/>

1 mark

## Light Bulbs

Brightlite company makes light bulbs.

The state of the company's machines can be:

available for use and being used

or available for use but not needed

or broken down.

- (a) The table shows the probabilities of the state of the machines in July 1994.

Write in the missing probability.

State of machines: July 1994	Probability
Available for use, being used	
Available for use, not needed	0.09
Broken down	0.03

1 mark

- (b) During another month the probability of a machine being available for use was 0.92.

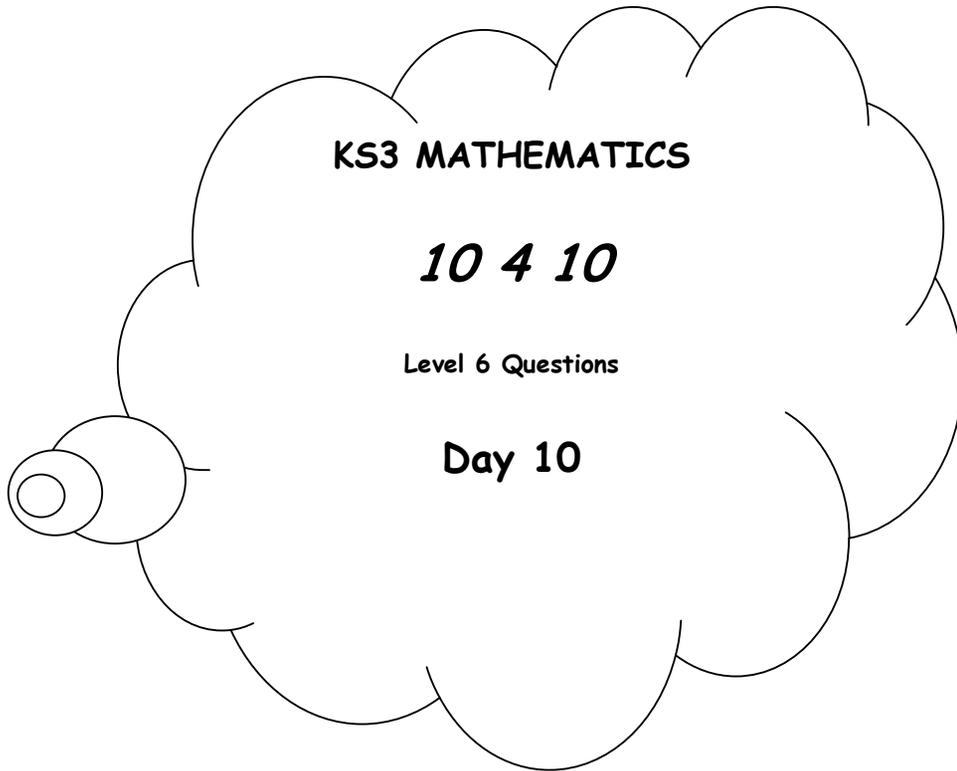
What was the probability of a machine being broken down?

.....

1 mark

- (c) Brightlite calculated the probabilities of a bulb failing within 1000 hours and within 2000 hours. Complete the table below to show the probabilities of a bulb still working at 1000 hours and at 2000 hours.

Time	Failed	Still working
At 1000 hours	0.07	
At 2000 hours	0.57	



## Mental Arithmetic Questions

1. It takes some-one one and a half minutes to swim the length of the pool. How many lengths can I swim in 15 minutes?

.....

2. Multiply minus eight by minus three.

.....

3. If  $4x + 3 = 23$ , what is the value of  $x$ ?

.....

4. I have a fair eight sided dice numbered 12 to 19. What is the probability that I will throw a prime number?

.....

5. What must I multiply  $n$  squared by to get  $n$  cubed?

.....

## Hedging

A garden centre sells plants for hedges.  
The table shows what they sold in one week.

Plants	Number of plants sold	Takings
Beech	125	£212.50
Leylandii	650	£2437.50
Privet	35	£45.50
Hawthorn	18	£23.40
Laurel	5	£32.25
<b>Total</b>	<b>833</b>	<b>£2751.15</b>

- (a) What percentage of the total number of plants sold was **Leylandii**?

Show your working.

..... %

2 marks

- (b) What percentage of the **total takings** was for Leylandii?

Show your working.

..... %

2 marks

- (c) Which is the cheapest plant, Beech or Privet?



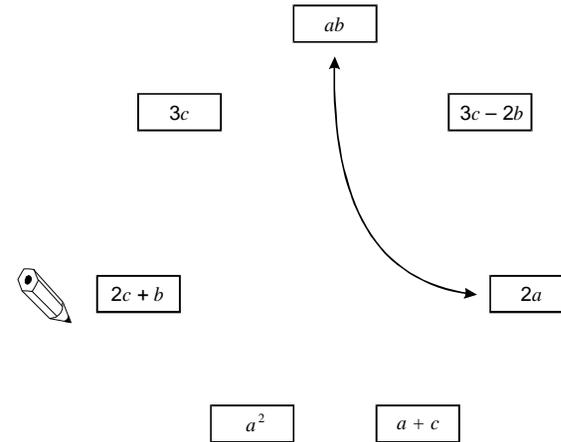
1 mark

1 mark

## Algebra Pairs

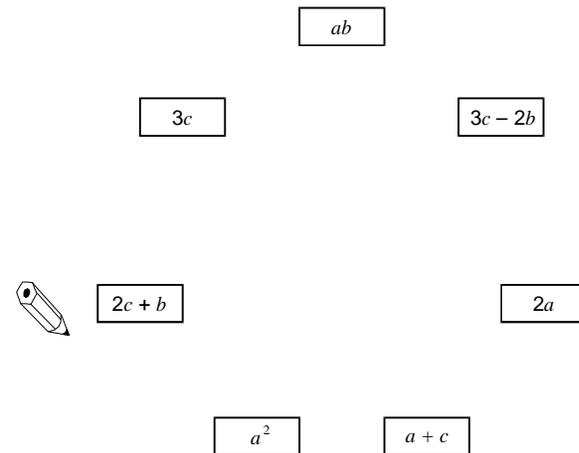
- (a) Join pairs of algebraic expressions that have the **same value** when  $a = 3$ ,  $b = 2$  and  $c = 6$

One pair is joined for you.



2 marks

- (b) Draw lines to join any pairs that will always have the **same value** when  $a = b = c$



3 marks