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Ma

KEY STAGE 3

TIER 4–6

2003

Mathematics test

Paper 2

Calculator allowed

Please read this page, but do not open your booklet until your teacher tells you to start. Write your name and the name of your school in the spaces below.

First name _____

Last name _____

School _____

Remember

- The test is 1 hour long.
- You may use a calculator for any question in this test.
- You will need: pen, pencil, rubber, ruler and a calculator.
- Some formulae you might need are on page 2.
- This test starts with easier questions.
- Try to answer all the questions.
- Write all your answers and working on the test paper – do not use any rough paper. Marks may be awarded for working.
- Check your work carefully.
- Ask your teacher if you are not sure what to do.

For marker's use only		
	Total marks	
	Borderline check	

QCA/03/967

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Instructions

Answers

This means write down your answer or show your working and write down your answer.

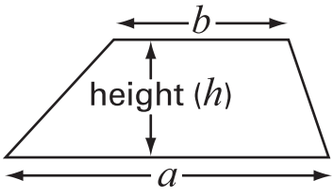
Calculators

You **may** use a calculator to answer any question in this test.

Formulae

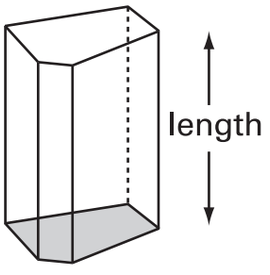
You might need to use these formulae

Trapezium



Area = $\frac{1}{2}(a + b)h$

Prism



Volume = area of cross-section × length

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1. The chart shows information about seven kings and queens.

It shows their ages when they died and how many years they ruled.

Use the chart to answer these questions.

(a) For how many years did **Edward III** rule?

..... years

1 mark

(b) Which king or queen died at the age of 69 and ruled for 44 years?

.....

1 mark

(c) Queen Victoria died at the age of 81 and ruled for 63 years.

Put a cross on the chart to show this information.

1 mark

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2. Mark did a survey.

He asked pupils in his school:

'Do you like the colour of the school uniform?'

The table shows his results.

	Yes	No	Don't know
Year 7	35	17	2
Year 8	20	24	5
Year 9	19	17	6

(a) How many pupils from **year 7** took part in the survey?

.....

1 mark

(b) Altogether, more pupils said '**Yes**' than said '**No**'.

How many more?

.....

1 mark

(c) Mark asked the same question to **40 pupils** in **year 11**

25% said 'Yes'. **50%** said 'No'. The rest said 'Don't know'.

Complete the table to show how many pupils from year 11 gave each answer.

	Yes	No	Don't know
Year 11			

. . . .

. . . .

2 marks

(d) Anna does a different survey with pupils in year 9

She wants to know if more boys than girls have pets.

She asks:

'Do you have a pet?'

What labels should Anna use on her results table?

Fill in the missing labels.

	.....	.....
.....		
.....		

. . . .

1 mark

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3. The table shows how much it costs to go to a cinema.

	Before 6pm	After 6pm
Adult	£3.20	£4.90
Child (14 or under)	£2.50	£3.50
Senior Citizen (60 or over)	£2.95	£4.90

Mrs Jones (aged 35), her daughter (aged 12), her son (aged 10) and a friend (aged 65) want to go to the cinema.

They are not sure whether to go before 6pm or after 6pm.

How much will they save if they go **before** 6pm?

Show your working.

. . . .

. . . .

£ . . . .

3 marks

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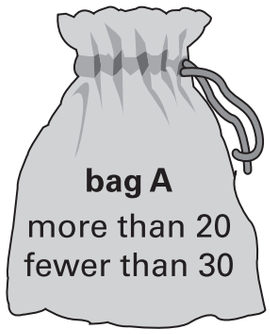
4. I have two bags of cubes.

Each bag contains more than 20 but fewer than 30 cubes.

(a) I can **share** the cubes in bag A **equally between 9** people.

How many cubes are in bag A?



....

1 mark

(b) I can **share** the cubes in bag B **equally between 4** people.

How many cubes could be in bag B?

There are two answers. Write them both.

..... or ....

. . . .

2 marks

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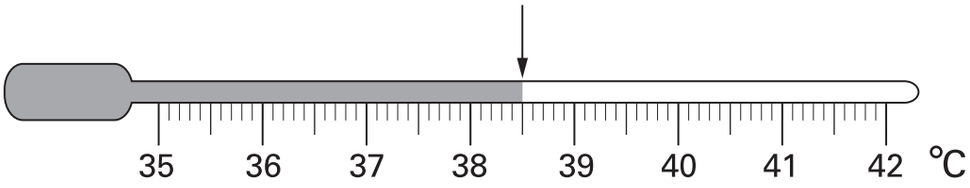
5. (a) The thermometer shows Alan's temperature.



Alan's normal temperature is **37.0**°C

How many degrees **higher than normal** is Alan's temperature?

°C

1 mark

(b) On Monday morning, Bina's temperature was **39.2**°C

By Tuesday morning, Bina's temperature had **fallen** by **1.3**°C

What was Bina's temperature on Tuesday morning?

°C

1 mark

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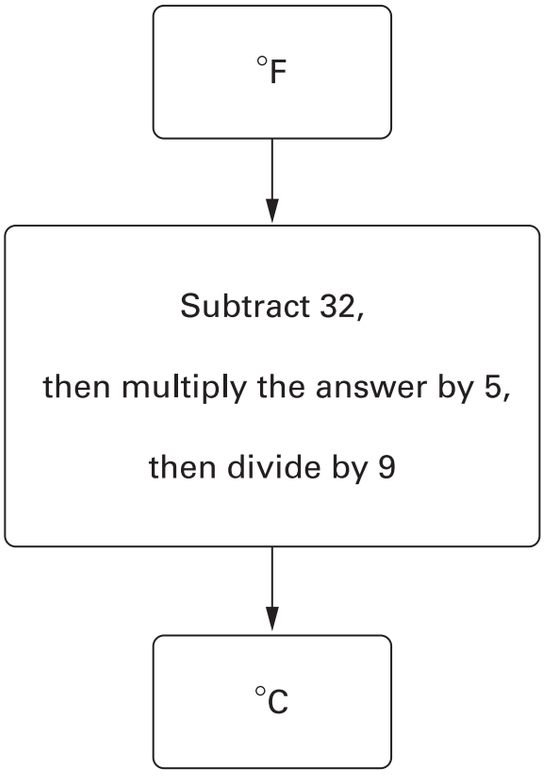
(c) You can measure temperature in °C or in °F

The diagram shows how to change °F to °C



The highest temperature ever recorded in a human was **115.7 °F**

What is this temperature in **°C**?

Show your working.

°C

2 marks

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6. In this question, all the grids are centimetre square grids.

(a) Draw a **rectangle** that has an **area** of **12 cm^2**

1 mark

(b) Draw another rectangle that has an area of 12 cm^2

This rectangle must have a **different perimeter** from the rectangle in part (a).

1 mark

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(c) Draw a **triangle** that has an **area** of **6 cm^2**

. . . .
1 mark

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7. (a) It is Tina's birthday. We do not know how old Tina is.

Call **Tina's age**, in years, n

The expressions below compare Tina's age to some other people's ages.

Use words to compare their ages. The first one is done for you.

Tina's age	n
Ann's age	$n + 3$

Ann is *3 years older than Tina*

Tina's age	n
Barry's age	$n - 1$

Barry is .....

Tina's age	n
Carol's age	$2n$

Carol is .....

2 marks

(b) In one year's time Tina's age will be $n + 1$

Write **simplified expressions** to show the ages of the other people in one year's time.

	Tina	Ann	Barry	Carol
Age now	n	$n + 3$	$n - 1$	$2n$
Age in one year's time	$n + 1$	.....	.....	.....

2 marks

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(c) When $n = 30$, find the value of $2n + 1$

. . . .

1 mark

When $n = 30$, find the value of $2(n + 1)$

. . . .

1 mark

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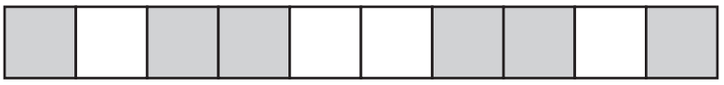
8. Each diagram below was drawn on a square grid.

(a) Write what **percentage** of each diagram is shaded.

The first one is done for you.

75 ..... %



..... %

1 mark

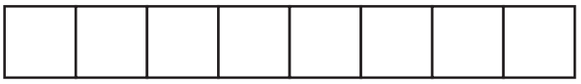
..... %

1 mark

(b) Explain how you know that **$12\frac{1}{2}$%** of the diagram below is shaded.

1 mark

(c) Shade **$37\frac{1}{2}$%** of the diagram below.



1 mark

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9. Some pupils plan a survey to find the most common types of tree in a wood.

Design 1

Instructions:
Write down the type of each tree that you see.

For example:
Elm, oak, oak, oak, sycamore, ash, ...

Design 2

Instructions:
Use these codes to record the type of each tree that you see.

Ash	A
Birch	B
Elm	E
Oak	O
Sycamore	S

For example:
E, O, O, O, S, A, ...

Design 3

Instructions:
Use a tally chart to record the type of each tree that you see.

For example:

Type of tree	Tally
Ash	I
Birch	
Elm	I
Oak	III
Sycamore	I
Other	

The pupils will only use one design.

(a) Choose a design they should **not** use.

Design .....

Explain why it is not a good design to use.

. . . . .
1 mark

(b) Choose the design that is the best.

Design .....

Explain why it is the best.

. . . . .
1 mark

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10. (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 $\frac{1}{2}$

. . . .
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.

. . . .
1 mark

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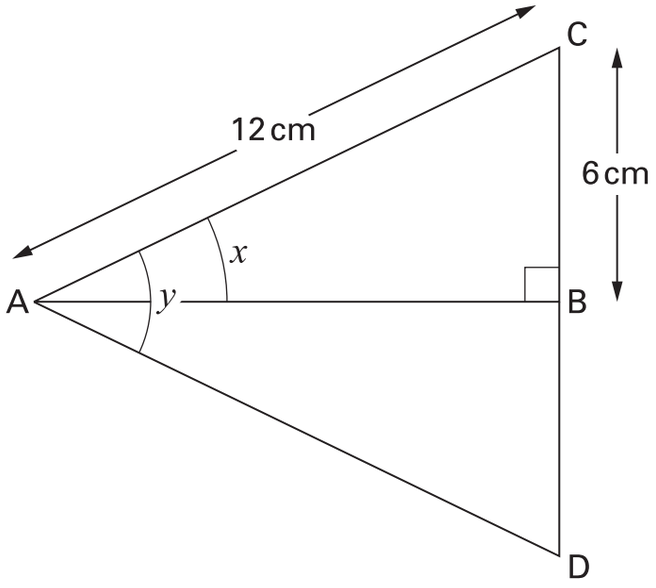
11. Look at the diagram.

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 ..... cm.

The length of CD is ..... cm.

ACD is an equilateral triangle because ..... 1 mark

so angle y is ..... ° because ..... 1 mark

so angle x is ..... ° because ..... 1 mark

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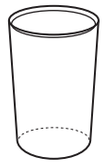
12. (a) A glass holds **225 ml**.



225 ml

An adult needs about **1.8 litres** of water each day to stay healthy.

How many glasses is that?

Show your working.

. . . . .

. . . . . .

. . . . .
2 marks

(b) An adult weighs **80 kg**.

60% of his total mass is water.

What is the mass of this water?

. . . . . kg

. . . . .
1 mark

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13. 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

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

The **area** of square A is **36 cm^2**

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.

. . . . .

. . . .

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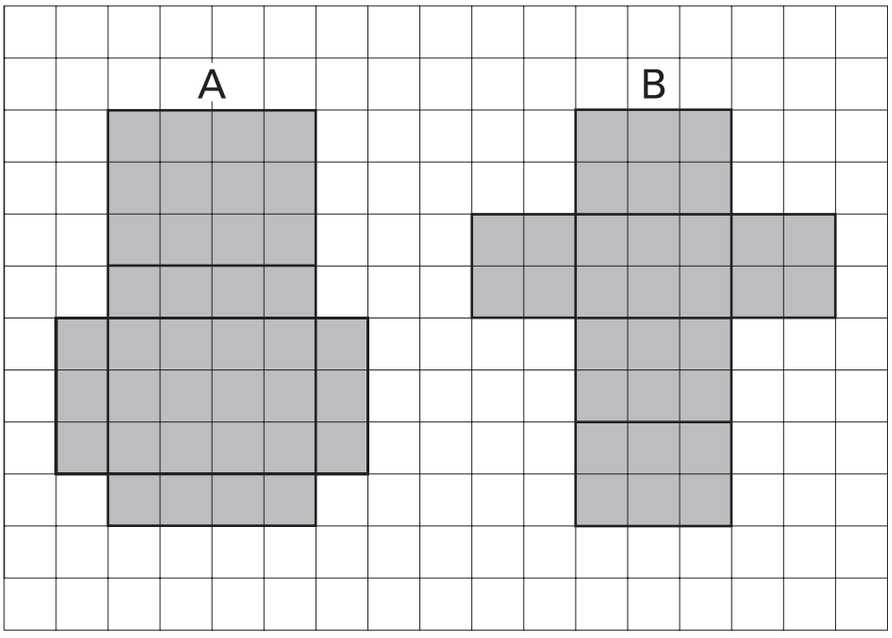
15. The squared paper shows the nets of cuboid A and cuboid B.



(a) Do the cuboids have the **same surface area**?

Show calculations to explain how you know.

. . . .

1 mark

(b) Do the cuboids have the **same volume**?

Show calculations to explain how you know.

. . . .

. . . .

2 marks

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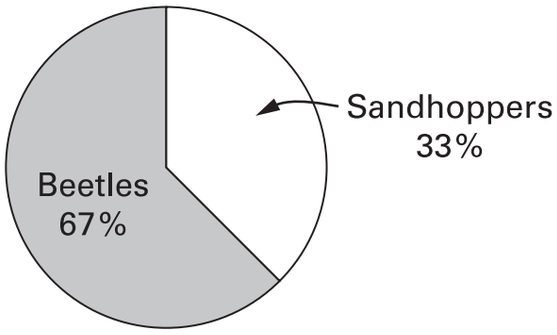
16. Two beaches are very similar.

A survey compared the number of animals found in one square metre on each beach.

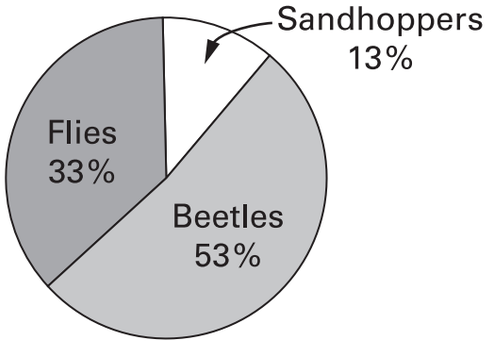
One beach had not been cleaned.

The other beach had been cleaned.

Beach: Not cleaned



Beach: Cleaned



(a) The data for the beach that had **not been cleaned** represent **1620** animals.

Complete the table to show how many of each animal were found.

Beach: Not cleaned

	Number found
Sandhoppers	
Beetles	
Flies	

. . . .

. . . .

2 marks

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(b) The data for the beach that had been **cleaned** represent **15** animals.

Complete the table to show how many of each animal were found on the cleaned beach.

	Beach: Cleaned
	Number found
Sandhoppers	
Beetles	
Flies	

. . . .

. . . .

2 marks

(c) Cleaning the beach changes the numbers of animals and the proportions of animals.

Write a sentence to describe **both** these changes.

. . . .

1 mark

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17. Find the values of t and r

$$\frac{2}{3} = \frac{t}{6}$$

$t =$ .....

1 mark

$$\frac{2}{3} = \frac{5}{r}$$

$r =$ .....

1 mark

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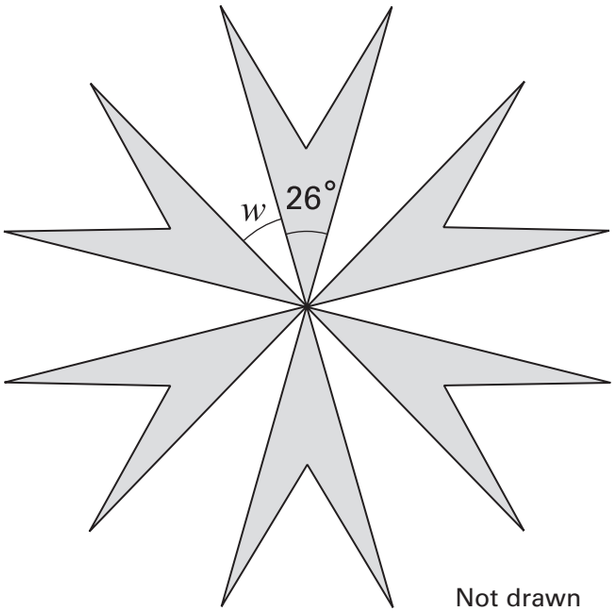
18. This pattern has rotation symmetry of order 6

What is the size of angle w ?

Show your working.



Not drawn accurately

. . . . .

. . . . . ° . . . . .

2 marks

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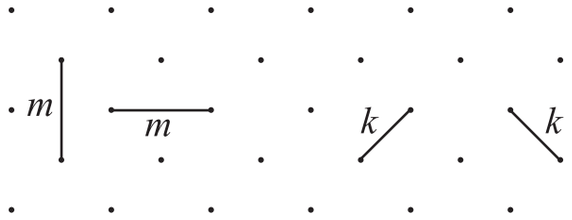
19. On the square grids below you can join dots with two different length lines.

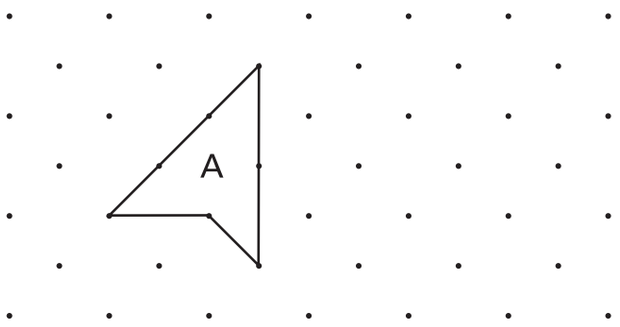
Length m is greater than length k



Draw a shape with each perimeter shown below.

The first one is done for you.

Perimeter $\mathbf{4}\boldsymbol{k} + \mathbf{3}\boldsymbol{m}$



Perimeter $\mathbf{4}\boldsymbol{k} + \boldsymbol{m}$

. . . . .
1 mark

Perimeter $\mathbf{2}(\mathbf{2}\boldsymbol{k} + \boldsymbol{m})$

. . . . .
1 mark

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END OF TEST

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