

Ma

YEAR
8

LEVELS
5–7

PAPER
2

Year 8 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 details in the spaces below.

First name _____

Last name _____

Class _____

Date _____

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, an angle measurer or protractor, a pair of compasses and a scientific or graphic 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 marking
use only

Total marks

Instructions

Answers



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

Calculators

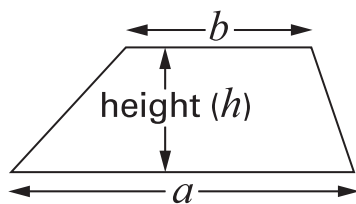


You **may** use a calculator to answer any question in this test.

Formulae

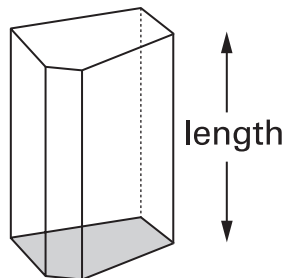
You might need to use these formulae.

Trapezium



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

Prism



$$\text{Volume} = \text{area of cross-section} \times \text{length}$$

1

Here is an algebra puzzle.

The shaded column shows the total of each row.

For example: $a + a + a = 24$

| | | | |
|-----|-----|-----|----|
| a | a | a | 24 |
| a | b | b | 28 |
| a | b | c | 19 |

Work out the values of a , b and c

1 mark

1 mark



$a = \dots\dots\dots$ $b = \dots\dots\dots$ $c = \dots\dots\dots$

1 mark



2

Leap year

1 month has 29 days.
4 months have 30 days.
7 months have 31 days.

Not a leap year

1 month has 28 days.
4 months have 30 days.
7 months have 31 days.

- (a) In a **leap year**, what is the **probability** that a month chosen at random has exactly **28 days**?



1 mark

- (b) In a year that is **not a leap year**, what is the **probability** that a month chosen at random has exactly **28 days**?



1 mark

- (c) In any year, what is the **probability** that a month chosen at random has **31 days**?



1 mark

3

Most new ovens have temperatures marked in $^{\circ}\text{C}$

Some old ovens have temperatures marked in units called gas marks.

Here is how to change gas marks to $^{\circ}\text{C}$:



(a) Gas mark **6** is hotter than gas mark **2**

How many $^{\circ}\text{C}$ hotter?



..... $^{\circ}\text{C}$

.....
2 marks

(b) What gas mark is **190 $^{\circ}\text{C}$** ?



Gas mark

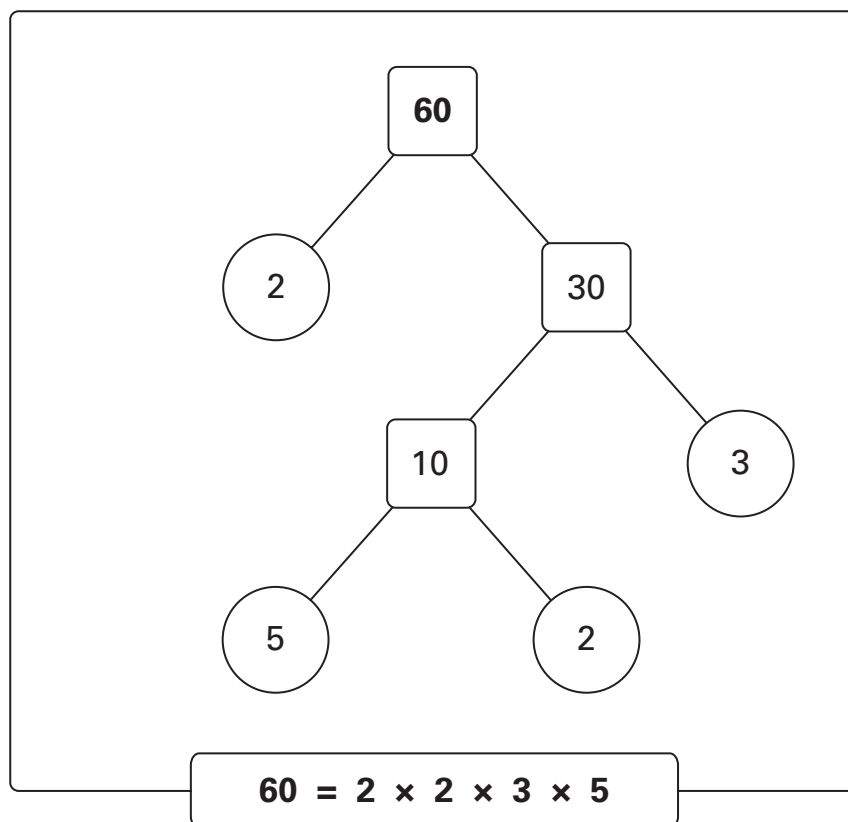
.....
2 marks



4

You can write any whole number as a product of its prime factors.

Here is an example for the number 60:



Write **225** as a product of its prime factors.



225 =

.....
2 marks

5

The perimeter of a **rectangle** is one metre.

Each **longer** side is 36 centimetres.

What is the length of each **shorter** side?



..... centimetres

.....
.....
2 marks

6

How many **two-digit** numbers have digits that add to twelve?



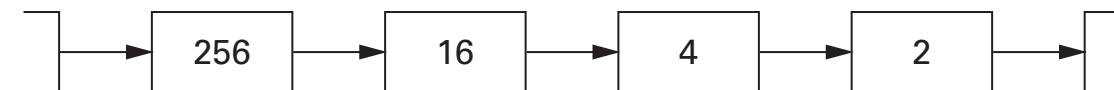
.....

.....
.....
2 marks



7

Look at this number chain.



Each number is the **square root** of the previous number.

(a) What number comes **after 2** in the chain?

Give your answer as a **decimal**.



1 mark

(b) What number comes **before 256** in the chain?



1 mark

(c) The chain goes on forever.

Will the number 0 ever be in the chain? Tick (✓) Yes or No.


☐

Yes

☐

No

Explain your answer.



1 mark

- 8 (a) Write these expressions as simply as possible.

The first one is done for you.

$$n + 1 + 2 \longrightarrow n + 3$$



$$3n + 5n$$



1 mark

$$2n + 7 + n + 2$$



1 mark

- (b) Multiply $(5n + 2)$ by 3

Write your answer without any brackets.



1 mark

- (c) Multiply $(n + 2)$ by $(n + 3)$

Write your answer without any brackets.



1 mark



9

Look at these three time intervals.

1 hour 25 minutes

125 minutes

1.25 hours

Arrange them in **size order**, shortest first.

Then fill in the missing number of minutes.



shortest

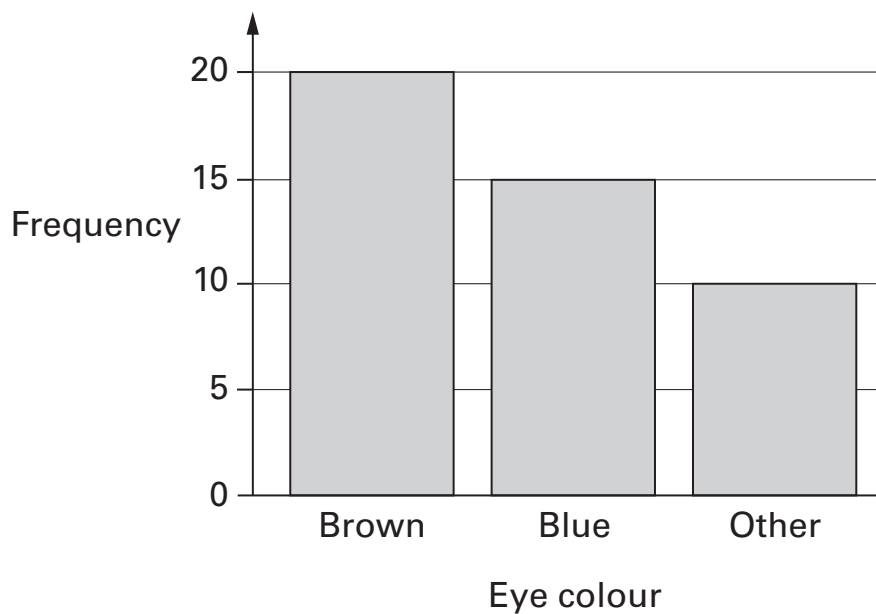
longest

difference in time is minutes

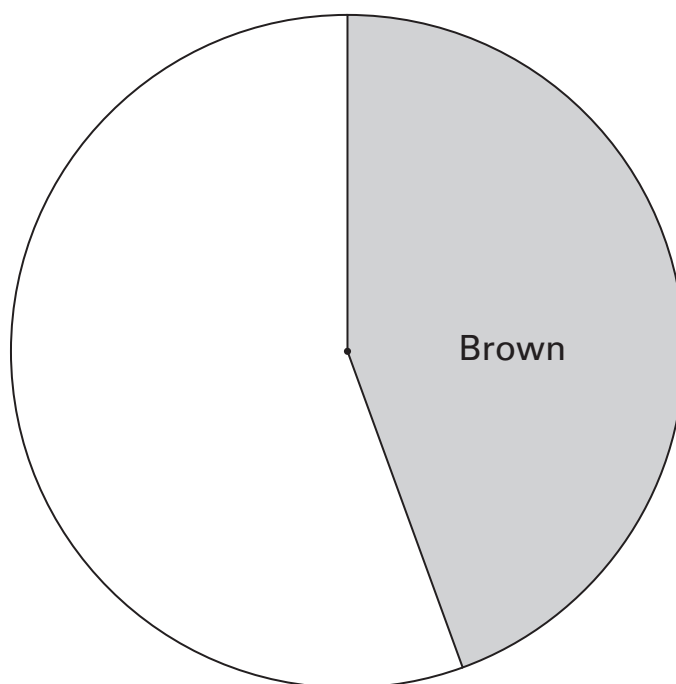
.....
2 marks

10

The bar chart shows the eye colour of **45** different people.



Complete the pie chart to show the same data.



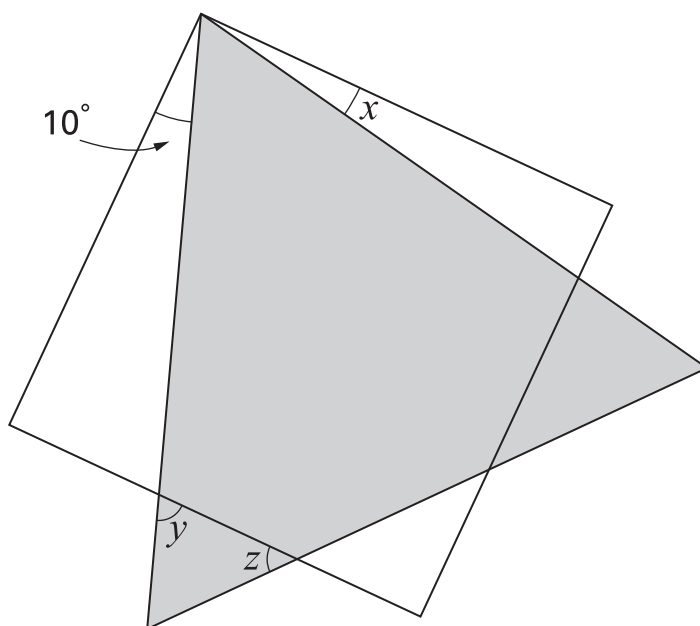
.....

2 marks



11

The diagram shows a **square** and an **equilateral triangle**.



Not drawn
accurately

Calculate the sizes of angles x , y and z

1 mark

1 mark



$x = \dots\dots\dots$

$y = \dots\dots\dots$

$z = \dots\dots\dots$

1 mark

12

Work out the answer to:

$$\frac{(128 - 89.6) \times 1.25}{128 - (89.6 \times 1.25)}$$



.....

1 mark

13

Tim Henman is a tennis player.

In 2002 a newspaper published this information about his earnings.

| On court earnings | Off court earnings |
|-------------------|--------------------|
| £ 700 000 | £ 2.1 million |

What percentage of Tim's **total** earnings was from **off court** earnings?

..... %

 2 marks


- 14 Pupils in year 8 wanted to know if pupils in year 7 liked their new school. They wrote a questionnaire.

(a) Here is one question.

Tick (✓) the statement that best describes why you like your new school.

- ☐ New subjects
- ☐ Able to make new friends
- ☐ Bigger playground

Give one reason why this is not a very good question.



1 mark

(b) Here is a different question.

Do you like school dinners?

- ☐ Yes ☐ No

Give one reason why this is not a very good question.



1 mark

15

The picture shows a two shilling coin.

People used these coins in England before the year 1971.



The **radius** of this coin is **1.4cm**.

What is the **area** of the face of the coin?



..... cm²

.....

.....
2 marks

16

Solve this equation.

$$5y + 3 = 3y + 14$$



$y =$

.....

.....
2 marks



17

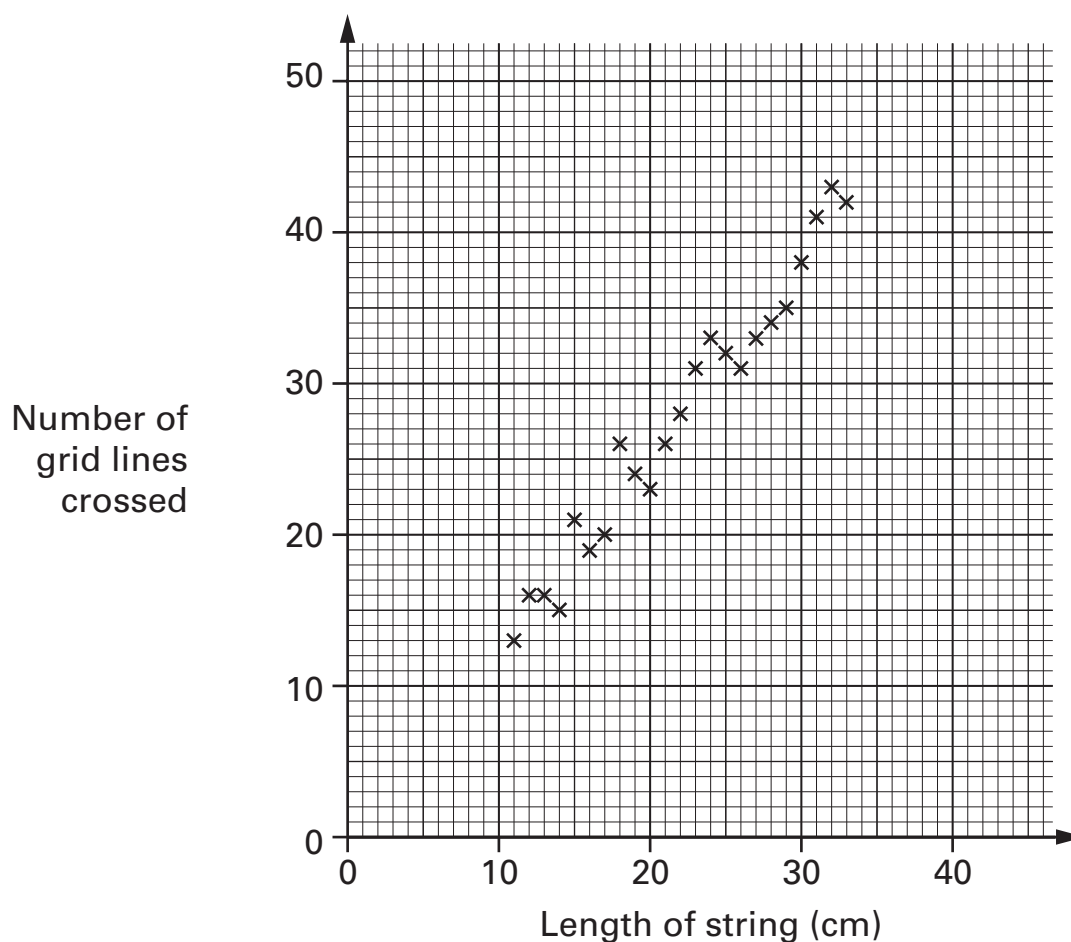
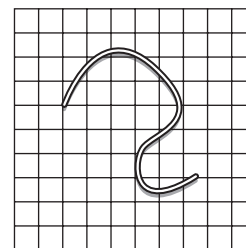
I did an experiment.

I dropped a piece of string onto a square grid.

I recorded the number of grid lines that it crossed.

I repeated the experiment with different lengths of string.

The scatter graph shows my results.



- (a) What is the relationship between the length of string and the number of grid lines crossed?



1 mark

- (b) I dropped a piece of string that crossed **50 grid lines**.
About how long do you think this piece of string was?



..... cm

1 mark

18

Different sequences of numbers start like this:

2 4 8 ...

- (a) The n th term of one of the sequences is $n(n - 1) + 2$

What is the **4th term** of this sequence?



.....

1 mark

- (b) The n th term of a different sequence is 2^n

What is the **4th term** of this sequence?



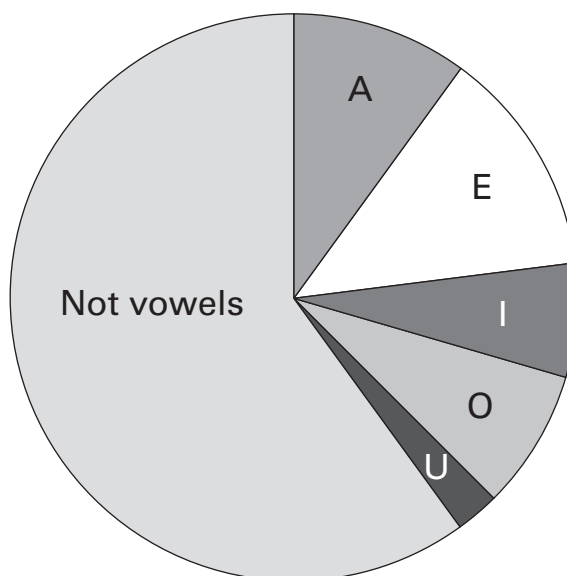
.....

1 mark



- 19 Writers use some letters of the alphabet more than others.

The pie chart shows how often one writer used vowels (A, E, I, O or U) in a sample of his writing.



- (a) Marie says:

'The pie chart shows the letter used most often is E'.

Do you agree with her? Tick (✓) Yes or No.


☐

Yes

☐

No

Explain your answer.



1 mark

- (b) The letter E was used **130 times**.

The angle of the sector representing E is **46.8°**

Altogether, how many letters were in the writer's sample?



2 marks

20

Look at this information.

There are about 60 million people living in the UK.

In every 1000 people there are about 200 who are aged under 16

Of the people aged under 16, about 20% had their sight tested last year.

About how many people aged under 16 had their sight tested last year?



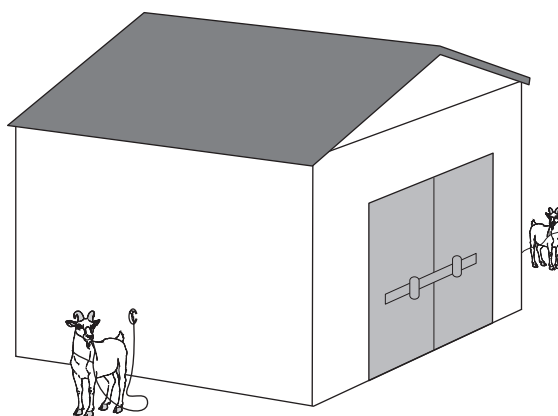
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.....

2 marks

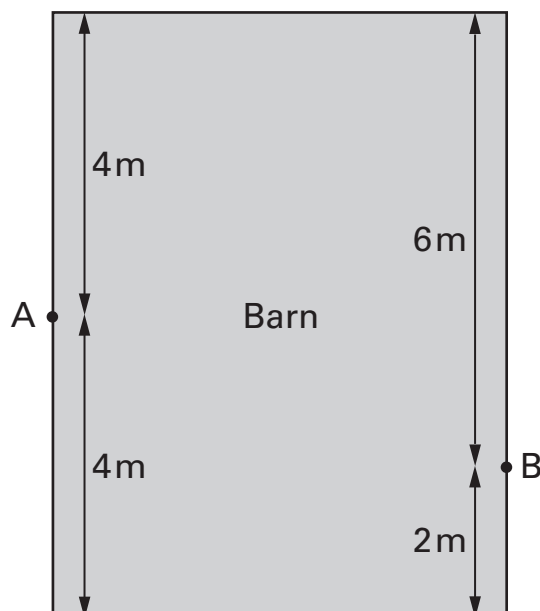
21

Two goats are tied to points A and B on opposite sides of a barn.



The scale drawing below shows the barn and where the goats are tied. Each goat can reach **exactly 4 metres**.

Draw **accurately** the area **each goat** can reach.



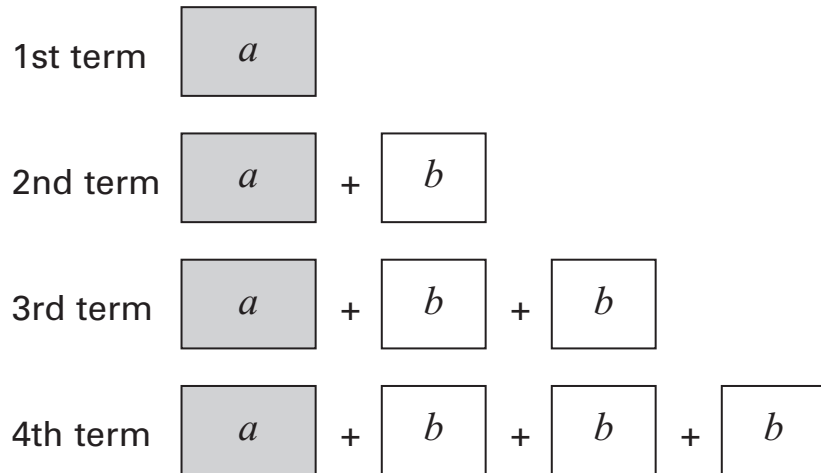
1 mark

. . . .

2 marks

- 22 (a) The diagrams represent a number sequence.

The sequence continues by adding b each time.



A pupil says:

The n th term is $a + nb$

The pupil is **wrong**. What is the n th term of the sequence?



1 mark

- (b) A number sequence begins:

12, 18, 24, 30 ...

The sequence continues by adding 6 each time.

What is the **81st term** of the sequence?

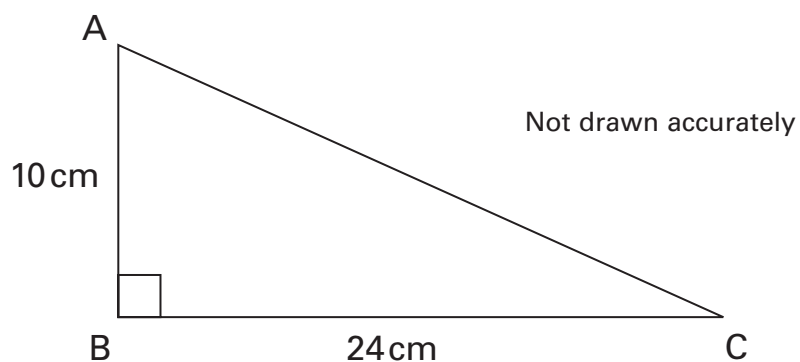


2 marks



23

The diagram shows a right-angled triangle.



Use Pythagoras' theorem to work out the length of side AC.



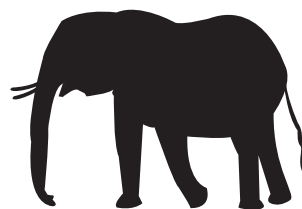
..... cm

.....
2 marks

24



Mr X runs
100 metres in 10 seconds



Elephant's average
running speed is **40km/h**

Which average speed is greater?

You **must** show your working.



.

2 marks



25

A pupil collected data on the number of people in cars.

| Number of people in each car | Frequency |
|---------------------------------|-----------|
| 1 | 178 |
| 2 | 32 |
| 3 | 26 |
| 4 | 4 |

Show that the **mean** number of people in a car was **1.4**



.....
.....
2 marks

END OF TEST



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