Mathematics test

Paper 1

Calculator not 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 must not use a calculator for any question in this test.
- You will need: pen, pencil, rubber, ruler, mirror and tracing paper (optional).
- 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
Instructions

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

Calculators
You must not 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 \( \times \) length
1. There are **seven different ways** to make **8p** with coins.

Complete the table to show the seven ways to make 8p.
Two have been done for you.

<table>
<thead>
<tr>
<th>Number of 5p coins</th>
<th>Number of 2p coins</th>
<th>Number of 1p coins</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>6</td>
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</tbody>
</table>
2. The diagram shows a matchbox.
   Its length is 5.3 cm. Its width is 3.6 cm. Its height is 1.5 cm.

(a) I join two matchboxes in different ways.

   Fill in the missing values.

   length = cm

   width = cm

   height = cm
(b) I start joining matchboxes like this:

How many matchboxes will be in the pile when its height is **12 cm**?
3. When you fold a **square** along a diagonal, you see a triangle.

   ![Diagram of a square being folded along a diagonal]

(a) What do you see when you fold a **rectangle** along a diagonal?

   ![Diagram of a rectangle being folded along a diagonal]

Ring the correct answer below.

1 mark
(b) Two different shapes are folded along a line of symmetry.

For each shape, the **dashed line** is the **fold line**.

For each shape, draw what the shape looked like **before** it was folded.
4. I buy a widescreen television costing £1290

I pay £900 now, then
I pay the rest of the money in 3 equal payments.

How much is each payment?
Show your working.

5. Steve needs to put 1 litre of water in a bucket.
He has a 500ml jug.

Explain how he can measure 1 litre of water.
The diagram shows some shapes on a 10 by 6 square grid.

(a) Which two shapes have the same area as shape A?

(b) Which two shapes have the same perimeter as shape A?

(c) How many of shape C would you need to cover a 10 by 6 square grid?
7. The bar charts show how many pupils went to a maths club.
Is each statement below true or false, or is there not enough information to tell? Tick (✓) the correct box.

(a) In each of these weeks, the day with the **most pupils** was **Monday**.

[ ] True  [ ] False  [ ] Not enough information

Explain your answer.

(b) In each of these weeks, the **same number** of pupils went to the club on **Friday**.

[ ] True  [ ] False  [ ] Not enough information

Explain your answer.

(c) In each of these weeks, the **same pupils** went to the club on **Friday**.

[ ] True  [ ] False  [ ] Not enough information

Explain your answer.
8. The diagram shows two straight lines.
Where the lines cross is called a point of intersection.

(a) Draw three straight lines that have only one point of intersection.

(b) Now draw three straight lines that have three points of intersection.

(c) Three straight lines have exactly two points of intersection.

Complete the sentence below.

Two of the lines must be __________________________

1 mark
9. The graph shows at what time the sun rises and sets in the American town of Anchorage.

The day with the most hours of daylight is called the longest day.

Fill in the gaps below, using the information from the graph.

The **longest day** is in the month of ......................

On this day, there are about .......... hours of daylight.

The **shortest day** is in the month of ......................

On this day, there are about .......... hours of daylight.
10. I buy a box of different size plasters.
Assume each plaster is equally likely to be the top plaster inside the box.

Altogether there are 35 plasters.
I take the top plaster from inside the box.

(a) What is the probability that the plaster is of size D?

(b) What is the probability that the plaster is of size A?

(c) What is the probability that the plaster is not of size A?
11. You can buy a new calculator for £1.25

In 1979 the same type of calculator cost 22 times as much as it costs now.

How much did the same type of calculator cost in 1979?

Show your working.

The graph shows their delivery charges.
(a) Use the graph to fill in the values in this table.

<table>
<thead>
<tr>
<th>Number of books</th>
<th>Delivery charge (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

(b) For every extra book you buy, how much more must you pay for delivery?

\[ \ldots \ldots p \]

(c) A second company sells books using the internet.
   Its delivery charge is **£1.00 per book**.

On the graph opposite, draw a line to show this information.

(d) Complete the sentence.

Delivery is cheaper with the **first** company
if you buy at least \[ \ldots \ldots \] books.
13. One way to make a magic square is to substitute numbers into this algebra grid.

\[
\begin{array}{ccc}
  a + b & a - b + c & a - c \\
  a - b - c & a & a + b + c \\
  a + c & a + b - c & a - b \\
\end{array}
\]

(a) Complete the magic square below using the values

\[a = 10 \quad b = 3 \quad c = 5\]

\[
\begin{array}{ccc}
  & & 5 \\
  & 10 & \\
 15 & & \\
\end{array}
\]
(b) Here is the algebra grid again.

\[
\begin{array}{ccc}
  a + b & a - b + c & a - c \\
  a - b - c & a & a + b + c \\
  a + c & a + b - c & a - b \\
\end{array}
\]

I use **different values** for \( a \), \( b \) and \( c \) to complete the magic square.

\[
\begin{array}{ccc}
  20 & 21 & 7 \\
  3 & 16 & 29 \\
  25 & 11 & 12 \\
\end{array}
\]

What values for \( a \), \( b \) and \( c \) did I use?

\[
a = \ldots \ldots \ldots \quad b = \ldots \ldots \ldots \quad c = \ldots \ldots \ldots 
\]

2 marks
14. Look at this diagram.

The diagram can help you work out some fraction calculations.

Calculate

\[
\frac{1}{12} + \frac{1}{4} = \]

1 mark

\[
\frac{1}{3} + \frac{1}{4} = \]

1 mark

\[
\frac{1}{3} - \frac{1}{6} = \]

1 mark
15. (a) A function maps the number $n$ to the number $n + 2$
Complete the missing values.

\[
\begin{array}{c|c}
    n & n + 2 \\
    \hline
    4 & \ldots \\
    \ldots & 20 \\
\end{array}
\]

1 mark

(b) A different function maps the number $n$ to the number $2n$
Complete the missing values.

\[
\begin{array}{c|c}
    n & 2n \\
    \hline
    4 & \ldots \\
    \ldots & 20 \\
\end{array}
\]

1 mark

(c) Many different functions can map the number 25 to the number 5
Complete the tables by writing two different functions.

\[
\begin{array}{c|c}
    n & \ldots \\
    \hline
    25 & 5 \\
\end{array}
\]

2 marks
16. You can make only four different cuboids with **16 cubes**.

<table>
<thead>
<tr>
<th>Cuboid</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1 1 16</td>
</tr>
<tr>
<td>B</td>
<td>1 2 8</td>
</tr>
<tr>
<td>C</td>
<td>1 4 4</td>
</tr>
<tr>
<td>D</td>
<td>2 2 4</td>
</tr>
</tbody>
</table>

(a) Which of the cuboids A and D has the **larger surface area**?

Tick (√) the correct answer below.

- Cuboid A ☐
- Cuboid D ☐
- Both the same ☐

Explain how you know.

1 mark
(b) Which cuboid has the **largest volume**?

Tick (✓) the correct answer below.

- Cuboid A
- Cuboid B
- Cuboid C
- Cuboid D
- All the same

(c) How many of **cuboid D** make a cube of dimensions $4 \times 4 \times 4$?

(d) You can make only six **different** cuboids with **24 cubes**.

Complete the table to show the dimensions.

Two have been done for you.

<table>
<thead>
<tr>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuboid E</td>
</tr>
<tr>
<td>Cuboid F</td>
</tr>
<tr>
<td>Cuboid G</td>
</tr>
<tr>
<td>Cuboid H</td>
</tr>
<tr>
<td>Cuboid I</td>
</tr>
<tr>
<td>Cuboid J</td>
</tr>
</tbody>
</table>
17. The shapes below are drawn on square grids.

(a) Is shape **A** an **equilateral triangle**? Tick (✓) Yes or No.

[ ] Yes [ ] No

Explain your answer.

(b) Is shape **B** a **kite**?

[ ] Yes [ ] No

Explain your answer.

(c) Is shape **C** a **square**?

[ ] Yes [ ] No

Explain your answer.
18. Write the missing numbers in the table.
The first row is done for you.

<table>
<thead>
<tr>
<th>First number</th>
<th>Second number</th>
<th>Sum of first and second numbers</th>
<th>Product of first and second numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>6</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-8</td>
<td></td>
<td>-5</td>
<td></td>
</tr>
</tbody>
</table>

19. Calculate \( \frac{5}{6} \times \frac{3}{5} \)

Show your working.
Write your answer as a fraction in its simplest form.
20. Rearrange the equations.

\[ b + 4 = a \]
\[ b = \ldots \]

1 mark

\[ 4d = c \]
\[ d = \ldots \]

1 mark

\[ m - 3 = 4k \]
\[ m = \ldots \]

1 mark
END OF TEST