Mathematics tests

Paper 2

Calculator allowed

<table>
<thead>
<tr>
<th>First name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle name</td>
<td></td>
</tr>
<tr>
<td>Last name</td>
<td></td>
</tr>
<tr>
<td>Date of birth</td>
<td>Day</td>
</tr>
<tr>
<td>School name</td>
<td></td>
</tr>
<tr>
<td>DfE number</td>
<td></td>
</tr>
</tbody>
</table>
Instructions

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

Work as quickly and as carefully as you can.

You have 30 minutes for this test.

If you cannot do one of the questions, go on to the next one.
You can come back to it later, if you have time.

If you finish before the end, go back and check your work.

Follow the instructions for each question carefully.

This shows where you need to put the answer.

If you need to do working out, you can use any space on a page.

Some questions have an answer box like this:

Show your method

For these questions you may get a mark for showing your method.
(a) There are \( n \) counters in Alfie’s bag. 

Alfie puts 3 more counters in the bag.

Write an expression for the number of counters that are in the bag now.

(b) Megan has two boxes.

There are \( m \) counters in each box.

She puts all her counters together in a pile, then removes 5 of them.

Write an expression for the number of counters that are in the pile now.
The arrow below points to the **mean** of the three numbers shown by crosses.

(a) Draw an arrow that points to the mean of the three numbers shown below.

(b) The arrow below points to the mean of three numbers.

One of the numbers is missing.

Draw a cross to show the position of the missing number.
Here are Alfie and Emma with their parents.

Mother's height 160cm

Father's height 180cm

You can use the table below to predict how tall children will be when they are adults.

There is one formula for boys and a different one for girls:

<table>
<thead>
<tr>
<th>Boy's predicted height</th>
<th>Girl's predicted height</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.4 (x + y) + 42$</td>
<td>$0.4 (x + y) + 29$</td>
</tr>
</tbody>
</table>

$x$ is the father's height in cm. $y$ is the mother's height in cm.

(a) Calculate the predicted height of Alfie when he is an adult.

\[
\text{cm} \quad \left(\frac{1}{1\text{ mark}}\right)
\]

(b) When Emma is an adult, she is predicted to be taller than her mother.

How much taller?

\[
\text{cm} \quad \left(\frac{1}{1\text{ mark}}\right)
\]
Two numbers are in the ratio 4 : 5

One of the numbers is 60

There are two possible values for the other number.

What are the two possible values?
A geyser is a jet of hot water that comes from below the Earth’s surface.

The graph shows information about the times when the jet of hot water appeared.

(a) What was the greatest time between two jets of water?

(b) Write in the missing information.

The jets of water lasted for different lengths of time.

The range of these times was about ________ seconds.
The cost to hire a boat on a lake is worked out using the information below.

**Cost to hire a boat:**
- £4.50 per boat
- and then
- £3.50 per hour

(a) Four friends hire a boat for five hours.
They share the cost equally.

How much does each person pay?

(b) Chen’s family hires a boat and pays a total of £15

How many hours did they have the boat for?
In a survey people were asked if they like tea and coffee. The results are in this Venn diagram.

(a) What percentage of people in the survey like both tea and coffee?

(b) What percentage of people in the survey do not like coffee?
Anna says $\frac{4}{7}$ is greater than $\frac{5}{9}$.

Explain why Anna is correct.
Two numbers have a **difference of 1**

They multiply together to make 9

Megan makes this spreadsheet to help find what the two numbers might be.

<table>
<thead>
<tr>
<th>first number</th>
<th>second number</th>
<th>multiply</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>2.1</td>
<td>3.1</td>
<td>6.51</td>
</tr>
<tr>
<td>2.2</td>
<td>3.2</td>
<td>7.04</td>
</tr>
<tr>
<td>2.3</td>
<td>3.3</td>
<td>7.59</td>
</tr>
<tr>
<td>2.4</td>
<td>3.4</td>
<td>8.16</td>
</tr>
<tr>
<td>2.5</td>
<td>3.5</td>
<td>8.75</td>
</tr>
<tr>
<td>2.6</td>
<td>3.6</td>
<td>9.36</td>
</tr>
</tbody>
</table>

Megan says,

> *From my spreadsheet, the best estimate for the two numbers is 2.5 and 3.5*

Chen says,

> *I can work out a better estimate for the two numbers.*

Write what Chen’s estimate could be.

and
The pie chart shows the Year groups of children at Woodland Infant School.

There are 56 children in Year 1

How many children are there in Reception?

Show your method

children

2 marks
This shape is a semi-circle.

What is the **perimeter** of the shape?

Use this formula:
the circumference of a circle is $3.14 \times \text{diameter}$

Show your method

2 marks
How many \textbf{days} old will the baby be when she has lived for \textbf{one million seconds}?

\begin{itemize}
\item \textbf{Show your method}
\end{itemize}

\begin{center}
\begin{tabular}{|c|}
\hline
\textbf{days} \\
\hline
\end{tabular}
\end{center}

2 marks