Paper 2
Calculator allowed

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, tracing paper and mirror (optional) 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.
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 \( \times \) length
1. Look at the graph.

(a) Write down the coordinates of points A and C.

A is ( , )

C is ( , )

(b) Point D can be marked so that ABCD is a rectangle.

Mark point D accurately on the graph.
2. (a) The diagram shows how two congruent ‘F-tiles’ fit together to make a rectangle.

Show how the two congruent ‘F-tiles’ can fit together to make this shape.

(b) Two other tiles fit together to make a different shape.
The two tiles are congruent but they are not ‘F-tiles’.

What shape could the tiles be?
Show them on the diagram.

What other shape could the tiles be?
Show them on the diagram.
3. These are the names of the twelve people who work for a company.

<table>
<thead>
<tr>
<th>Ali</th>
<th>Claire</th>
<th>Kiki</th>
<th>Suki</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brian</td>
<td>Claire</td>
<td>Lucy</td>
<td>Tom</td>
</tr>
<tr>
<td>Claire</td>
<td>James</td>
<td>Ryan</td>
<td>Tom</td>
</tr>
</tbody>
</table>

(a) What name is the mode?

(b) One person leaves the company. A different person joins the company. Now the name that is the mode is Tom.

Write the missing names in the sentences below.

- The name of the person who leaves is ____________

- The name of the person who joins is ____________
4. The scale drawing shows three leaves from different trees.
   The drawing on the right shows the leaves drawn on top of each other.

   ![Oak](image1) ![Beech](image2) ![Willow](image3)

(a) Compare the areas of the leaves.
   Write the leaves in order, **smallest area first**.

   ![Comparison of areas](comparison1)

(b) Now compare the perimeters of the leaves.
   Write the leaves in order, **smallest perimeter first**.

   ![Comparison of perimeters](comparison2)
5. Here is information about some bags of marbles.

Altogether, there are 10 bags.
Each bag contains 12 marbles.
Each marble weighs 7 grams.

Use the information to match each question with the correct calculation.
The first one is done for you.

<table>
<thead>
<tr>
<th>Question</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>How many <strong>bags</strong> are there altogether?</td>
<td>10</td>
</tr>
<tr>
<td>How many <strong>marbles</strong> are there altogether?</td>
<td>10 × 12</td>
</tr>
<tr>
<td>How much does <strong>each</strong> bag of marbles weigh?</td>
<td>12 × 7</td>
</tr>
<tr>
<td>How much do <strong>all 10</strong> bags of marbles weigh altogether?</td>
<td>10 + 12 + 7</td>
</tr>
</tbody>
</table>

2 marks
6. Look at this equation.

\[ 4 + a = b \]

Write a pair of numbers for \( a \) and \( b \) to make the equation true.

\[ a = \underline{\hspace{2cm}} \quad b = \underline{\hspace{2cm}} \]

Now write a different pair of numbers for \( a \) and \( b \) to make the equation true.

\[ a = \underline{\hspace{2cm}} \quad b = \underline{\hspace{2cm}} \]
7. Here is a shape.

I turn the shape through 45° clockwise.

Tick (✓) the diagram that shows the shape after the turn.

8. Leena buys balloons, hats and masks for a party.

Write the missing numbers in the table.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Number bought</th>
<th>Total cost (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packets of balloons</td>
<td>4.95</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hats</td>
<td>3.20</td>
<td></td>
<td>41.60</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masks</td>
<td></td>
<td>10</td>
<td>19.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9. Carlos and Mary each did a survey.

(a) Carlos asked people: ‘Have you ever been to North America?’

The percentage bar chart shows his results.

<table>
<thead>
<tr>
<th></th>
<th>0%</th>
<th>20%</th>
<th>40%</th>
<th>60%</th>
<th>80%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

40 people said No.

How many people said Yes?

_________ people

1 mark

(b) Mary asked 10 people: ‘Would you like to go to South America?’

Results: 5 of the 10 people said ‘No’.
4 of the 10 people said ‘Don’t know’.
1 of the 10 people said ‘Yes’.

Complete the percentage bar chart to show these results.
10. The graph shows the date each year that frogs’ eggs were first seen.

(a) On what date in 1997 were frogs’ eggs first seen?

(b) At the beginning of each year, the warmer the weather, the earlier frogs’ eggs are first seen. What can you say about the weather at the beginning of 1991?
11. (a) Here is an expression.

\[ 2a + 3 + 2a \]

Which expression below shows it written as simply as possible?
Put a ring round the correct one.

- \[ 7a \]
- \[ 7 + a \]
- \[ 2a + 5 \]
- \[ 4a + 3 \]
- \[ 4(a + 3) \]

(b) Here is a different expression.

\[ 3b + 4 + 5b - 1 \]

Write this expression as simply as possible.

\[ \text{[Blank]} \]
12. Here are two containers and the amounts they hold.

A
750 millilitres

B
0.5 litre

Which container holds the greater amount?


How much more does it hold?

Give your answer in millilitres.

__________ millilitres

1 mark

13. (a) A triangle has three equal sides.

Write the sizes of the angles in this triangle.

° , ° , °

1 mark

(b) A right-angled triangle has two equal sides.

Write the sizes of the angles in this triangle.

° , ° , °

1 mark
14. The diagram shows five fair spinners with grey and white sectors. Each spinner is divided into equal sectors.

I am going to spin all the pointers.

(a) For one of the spinners, the probability of spinning grey is \(\frac{3}{4}\). Which spinner is this? Write its letter.

(b) For two of the spinners, the probability of spinning grey is more than 60% but less than 70%. Which two spinners are these? Write their letters.
15. (a) Look at the drawing of a prism on the grid.

How many **faces** does the prism have?

(b) Use the grid below to draw a solid with **6 faces**.
16. The graph shows the average heights of fir trees of different ages.

![Graph showing the average heights of fir trees of different ages. The graph has a linear trend with age on the x-axis and height on the y-axis. The data points are not labeled, but the trend is clear.]

The table shows the cost of fir trees of different heights.

<table>
<thead>
<tr>
<th>Height Range</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>120cm to 159cm</td>
<td>£20.00</td>
</tr>
<tr>
<td>160cm to 199cm</td>
<td>£25.00</td>
</tr>
<tr>
<td>200cm to 239cm</td>
<td>£30.00</td>
</tr>
</tbody>
</table>

(a) One of these fir trees is $5\frac{1}{2}$ years old.

**How much** is it likely to cost?

(b) One of these fir trees costs £25.00

**How old** is the tree likely to be?

Between _________ and _________ years old
17. Here is a rectangle.

![Rectangle Diagram](Not drawn accurately)

8 cm
2 cm

(a) A square has the same area as this rectangle.

What is the side length of this square?

\[
\text{\underline{\hspace{2cm}} cm} \quad \text{1 mark}
\]

(b) A different square has the same perimeter as this rectangle.

What is the side length of this square?

\[
\text{\underline{\hspace{2cm}} cm} \quad \text{1 mark}
\]
18. Kate buys 24 cans of lemonade.

She buys the cans in packs of 4
Each pack costs £1.20

Steve buys 24 cans of lemonade.

He buys the cans in packs of 6
Each pack costs £1.60

Kate pays more for her 24 cans than Steve pays for his 24 cans.

How much more?
19. Three shapes fit together at point B.

Will ABC make a straight line?

☐ Yes  ☐ No

Explain your answer.

20. Solve these equations.

\[32x + 53 = 501\]

\[x = \ldots\]

\[375 = 37 + 26y\]

\[y = \ldots\]
21. In a survey, 60 people were asked:

What kind of newspaper did you buy today?

Here are the results.

<table>
<thead>
<tr>
<th>Type of newspaper</th>
<th>Number of people</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning newspaper</td>
<td>35</td>
</tr>
<tr>
<td>Evening newspaper</td>
<td>10</td>
</tr>
<tr>
<td>No newspaper</td>
<td>15</td>
</tr>
</tbody>
</table>

Complete the pie chart to show this information.
22. Look at the information.

\[
\begin{align*}
\text{x} &= 4 \\
\text{y} &= 13
\end{align*}
\]

Complete the rules below to show different ways to get \( y \) using \( x \).

The first one is done for you.

To get \( y \), **multiply** \( x \) by \( 2 \) and **add** \( 5 \).

This can be written as \( y = 2x + 5 \).

To get \( y \), **multiply** \( x \) by \( \text{__________} \) and **add** \( \text{__________} \).

This can be written as \( y = \text{__________} \).  

\[1 \text{ mark}\]

To get \( y \), **multiply** \( x \) by \( \text{__________} \) and **subtract** \( \text{__________} \).

This can be written as \( y = \text{__________} \).

\[1 \text{ mark}\]

To get \( y \), **divide** \( x \) by \( \text{__________} \) and **add** \( \text{__________} \).

This can be written as \( y = \text{__________} \).

\[1 \text{ mark}\]
23. The diagram shows a shaded parallelogram drawn inside a rectangle.

What is the area of the shaded parallelogram?

You must give the correct unit with your answer.
24. Write the missing numbers.

\[ 6x + 2 = 10 \]

so \[ 6x + 1 = _____ \]

\[ 1 - 2y = 10 \]

so \[ (1 - 2y)^2 = _____ \]

25. The value of \( \pi \) correct to 7 decimal places is:

\[ 3.1415927 \]

(a) Write the value of \( \pi \) correct to 4 decimal places.

(b) Which value below is closest to the value of \( \pi \)?

Put a ring round the correct one.

\[ \frac{179}{57}, \quad 3 \frac{1}{7}, \quad \left( \frac{16}{9} \right)^2, \quad 355 \quad 113 \]
26. Enlarge the shaded shape by a **scale factor of 2**, using **P** as the centre of enlargement.
27. (a) Here are two equations.

\[
\begin{align*}
    k &= a + b \\
    a + b + k &= 30
\end{align*}
\]

What is the value of \(k\)?

\[ k = \quad \text{1 mark} \]

(b) Look at this information.

\[
\begin{align*}
    10 &= c + d \\
    c &\text{ is one more than } d
\end{align*}
\]

What is the value of \(c\)?

\[ c = \quad \text{1 mark} \]
28. A pupil investigated how the teachers at his school travel to work. The table shows the results.

<table>
<thead>
<tr>
<th>Number of teachers who travel by car</th>
<th>Number of teachers who do not travel by car</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>7</td>
</tr>
</tbody>
</table>

(a) What percentage of these teachers travel by car?

(b) 18 teachers travel by car. Some of these teachers travel together. Write the missing frequency in the table below.

<table>
<thead>
<tr>
<th>Number of teachers in one car</th>
<th>Number of cars</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 mark</td>
</tr>
<tr>
<td>2</td>
<td>4 mark</td>
</tr>
<tr>
<td>3</td>
<td>2 mark</td>
</tr>
</tbody>
</table>
29. Jenny wants to multiply out the brackets in the expression $3(2a + 1)$

She writes: $3(2a + 1) = 6a + 1$

Show why Jenny is wrong.

1 mark

30. A computer is going to choose a letter at random from an English book.

The table shows the probabilities of the computer choosing each vowel.

<table>
<thead>
<tr>
<th>Vowel</th>
<th>A</th>
<th>E</th>
<th>I</th>
<th>O</th>
<th>U</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability</td>
<td>0.08</td>
<td>0.13</td>
<td>0.07</td>
<td>0.08</td>
<td>0.03</td>
</tr>
</tbody>
</table>

What is the probability that it will not choose a vowel?

2 marks
END OF TEST