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, tracing paper (optional) 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.
**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.

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**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. Complete the table to show what the units measure.

The first row is done for you.

<table>
<thead>
<tr>
<th>Length</th>
<th>Area</th>
<th>Volume</th>
<th>Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centimetres</td>
<td></td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Litres</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grams</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Square metres</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ounces</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. The charts show information about a rainforest.
Use the charts to answer these questions.

(a) In the month that has the **lowest** average **rainfall**, what is the average **temperature**?

\[ \text{\underline{\hspace{2cm}}} \text{°C} \]  

1 mark

(b) In the month that has the **highest** average **temperature**, what is the average **rainfall**?

\[ \text{\underline{\hspace{2cm}}} \text{mm} \]  

1 mark

(c) Sanjay has decided to visit the rainforest. He does **not** like high temperatures and does **not** like high rainfall.

In which month do you think Sanjay should visit?

Put a ring round the correct month below.

[ ] January  [ ] March  [ ] April  [ ] October  [ ] December

1 mark
3. Here are the prices of doughnuts at two different shops.

<table>
<thead>
<tr>
<th>Shop A</th>
<th>Shop B</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 doughnuts for £2</td>
<td>5 doughnuts for £3.50</td>
</tr>
</tbody>
</table>

I want to buy 15 doughnuts.

In which shop are the doughnuts cheaper?

You must show your working.

Tick (✔) your answer.

- [ ] Shop A
- [ ] Shop B

2 marks
4. The table shows the stopping distances for a car at different speeds.

<table>
<thead>
<tr>
<th>Speed</th>
<th>Stopping distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>20mph</td>
<td>12 metres</td>
</tr>
<tr>
<td>40mph</td>
<td>36 metres</td>
</tr>
<tr>
<td>60mph</td>
<td>72 metres</td>
</tr>
</tbody>
</table>

(a) Look at the square grid below.

It shows the bar for the stopping distance at 20mph.

Use the same scale to draw the bar for the stopping distance at 40mph.

(b) The bar for the stopping distance at 60mph will not fit on the grid.

How many squares long should the bar be?
5. Here is a shaded shape drawn on a square grid.

Rotate the shape $180^\circ$ about point A.

Draw the shape in its new position on the grid.
6. Use \( a = 7 \) and \( b = 28 \) to work out the value of these expressions.

The first one is done for you.

\[
a + b = 35
\]

\[
ab = \underline{560}
\]

\[
\frac{b}{a} = \underline{4}\frac{1}{7}
\]

\[
(a + b)^2 = \underline{1499}
\]
7. Look at the cuboid drawn on the grid.

It is made from **12 cubes**.

On the grid below, draw a **different** cuboid made from 12 cubes.
8. The graph shows how much a company charges to deliver parcels.

(a) Use the graph to complete the sentences below.

The company charges exactly £_______ for parcels up to _______ kg. ___________ 

Then for each extra kilogram the company charges another ______________. ___________ 

(b) Altogether, how much would the company charge to deliver two parcels, one of 15kg and one of 37kg?

£_____________ ___________
9. The diagram below shows a trapezium and an equilateral triangle.

The trapezium has area \( a \)
The triangle has area \( b \)

(a) On the grid below, draw a shape with area \( a + 2b \)

(b) On the grid below, draw a shape with area \( a - b \)
10. The diagram shows a right-angled triangle.

P, Q and R are the **midpoints** of the sides of the triangle.

Work out the coordinates of P, Q and R.

- P is (______, ______)  
  1 mark

- Q is (______, ______)  
  1 mark

- R is (______, ______)  
  1 mark
The table shows information about the rainfall in two places in South America.

<table>
<thead>
<tr>
<th>Place</th>
<th>Season</th>
<th>Mean rainfall</th>
<th>Number of months</th>
<th>Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Dry</td>
<td>10 cm per month</td>
<td>8</td>
<td>Jan to Aug</td>
</tr>
<tr>
<td></td>
<td>Wet</td>
<td>20 cm per month</td>
<td>4</td>
<td>Sept to Dec</td>
</tr>
<tr>
<td>B</td>
<td>Dry</td>
<td>5 cm per month</td>
<td>10</td>
<td>July to Apr</td>
</tr>
<tr>
<td></td>
<td>Wet</td>
<td>50 cm per month</td>
<td>2</td>
<td>May to June</td>
</tr>
</tbody>
</table>

Which of the places has **more rainfall** on average over the whole year?

Show working to explain your answer.

Tick (✓) your answer.

A   B

2 marks
12. The distance needed for a car to stop depends on how fast the car is travelling. This distance can be calculated by adding the thinking distance and the braking distance.

For example: at \(30\) miles per hour

\[
\begin{array}{ccc}
30 \text{ feet} & + & 45 \text{ feet} \\
\text{thinking distance} & + & \text{braking distance}
\end{array} = 75 \text{ feet}
\]

\[
\text{total stopping distance}
\]

Here are the formulae to work out the thinking distance and the braking distance for a car travelling at \(V\) miles per hour.

\[
\text{Thinking distance} = V \text{ feet} \quad \text{Braking distance} = \frac{V^2}{20} \text{ feet}
\]

(a) A car is travelling at \(70\) miles per hour.

What is the total stopping distance for this car?

\[
\underline{\text{feet}} \quad 2 \text{ marks}
\]

(b) A different car is travelling so that its braking distance is \(125\) feet.

How fast is the car travelling?

\[
\underline{\text{miles per hour}} \quad 1 \text{ mark}
\]
13. Shape A and shape B are each made from five identical squares.

The perimeter of shape A is 72 cm.

Work out the perimeter of shape B.

\[ \text{perimeter of shape B} \]

\[ \text{cm} \]

2 marks

14. In one year, 2 million tonnes of glass bottles and jars were thrown away in the UK.

38\% of these bottles and jars were recycled.

How many tonnes of the bottles and jars were recycled?

\[ \text{tonnes} \]

2 marks
15. (a) Look at the equilateral triangle.

Each angle in an equilateral triangle is $60^\circ$

Explain why.

(b) Now look at this shape.

Work out the sizes of angles $a$, $b$ and $c$

\[
a = \quad ^\circ \quad b = \quad ^\circ \quad c = \quad ^\circ \quad
\]

1 mark

2 marks
16. A teacher has five bags containing only red and blue counters.

The table shows how many red and blue counters are in each bag.

<table>
<thead>
<tr>
<th>Bag</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red counters</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Blue counters</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

The teacher is going to take a counter at random from each bag.

Match each bag with the correct probability of taking a **blue** counter below.

The first one is done for you.

```
<table>
<thead>
<tr>
<th>Bag</th>
<th>Probability of taking a blue counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>(\frac{1}{4})</td>
</tr>
<tr>
<td>B</td>
<td>(\frac{1}{3})</td>
</tr>
<tr>
<td>C</td>
<td>(\frac{1}{2})</td>
</tr>
<tr>
<td>D</td>
<td>(\frac{5}{11})</td>
</tr>
<tr>
<td>E</td>
<td>(\frac{2}{5})</td>
</tr>
</tbody>
</table>
```
17. In a survey, pupils were asked if they owned a bicycle.

Results: \( \frac{3}{8} \) of the pupils said ‘Yes’.

\( \frac{5}{8} \) of the pupils said ‘No’.

46 more pupils said ‘No’ than said ‘Yes’.

Altogether, how many pupils were in the survey?
18. In this question you will need the following information about hens’ eggs.

Approximate mass, in grams, is given by:

\[ \text{Mass} = \frac{\pi y^3}{10} \times 1.15 \]

The length, \( y \), of an egg is \( 5.5 \text{cm} \).

Use the formula to find the grade of the egg.

You must show your working.

\[ \text{Grade} \]
19. A shop sells rings of different sizes.

The diagram shows the diameters of the different sizes.

- **size 5**: 15.7mm
- **size 6**: 16.5mm
- **size 7**: 17.3mm
- **size 8**: 18.2mm
- **size 9**: 18.9mm

(a) What is the circumference of a **size 8** ring?

(b) Rachel wants to buy a ring for her middle finger. That finger has a circumference of 51mm. What size ring should she buy? Show working to explain your answer.

Tick (✓) your answer.
20. Look at this calculation.

\[3^5 + 10^2 = 7^x\]

Find the value of \(x\).

You must show your working.

\[x = \underline{\phantom{0}}\]

2 marks

21. The table below shows the number of schools and the number of pupils in England.

<table>
<thead>
<tr>
<th>Number of schools</th>
<th>Total number of pupils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>17 642</td>
</tr>
<tr>
<td>Secondary</td>
<td>3 385</td>
</tr>
</tbody>
</table>

Show that, on average, a secondary school has about four times as many pupils as a primary school.

2 marks
22. The cuboid container below holds **12 litres** of water when full.

One litre is 1000cm$^3$

The inside length and width of the cuboid are **40cm** and **20cm**.

What is the inside **height** of the cuboid?

\[
\text{Height} = \underline{\phantom{0}} \text{ cm}
\]

2 marks
23. The first three terms of a sequence are shown in the box.

\[5, \ 16, \ 27, \ \ldots\]

Look at each expression below.

Write ‘No’ if it could not be the \(n\)th term expression for this sequence.

Write ‘Yes’ if it could be the \(n\)th term expression for this sequence and then work out the 4th term.

The first one is done for you.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Could it be the (n)th term expression?</th>
<th>If ‘Yes’, work out the 4th term</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5n)</td>
<td>No</td>
<td>[\times]</td>
</tr>
<tr>
<td>(n + 11)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(11n - 6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n^2(6 - n))</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3 marks
There are 6 units in an exam course.

Each unit is marked out of 100

To get grade A, the mean mark of all six units must be at least 80

Tom has taken five units. His mean mark is 78

To get grade A, how many marks must he get on the last unit?
25. (a) The grid shows a straight line.

The equation of the line is \( y = x \)

Two of the equations below also describe the straight line \( y = x \)

Put rings round the correct equations.

\[ x = y \quad y = -x \quad xy = 0 \]

\[ x - y = 0 \quad x + y = 0 \]

1 mark

(b) Write the coordinates of two points that have an \( x \) coordinate that is one less than the \( y \) coordinate.

\( ( \quad , \quad ) \quad ( \quad , \quad ) \)

What would be the equation of the straight line through these two points?

1 mark
In 2004 a newspaper published this incorrect report:

Houses cost £60 000 one year ago.

They now cost £80 000

This is a 25% increase.

Write the missing numbers below to make each statement correct.

(a) Houses cost £60 000 one year ago.

They now cost £______________

This is a 25% increase.

(b) Houses cost £60 000 one year ago.

They now cost £80 000

This is a __________ % increase.
END OF TEST