Fill in these boxes and read what is printed below.

Full name of centre       Town

Forename(s)              Surname

Date of birth
Day  Month  Year  Scottish candidate number  Number of seat

1 You may not use a calculator.
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FORMULAE LIST

Circumference of a circle: \( C = \pi d \)
Area of a circle: \( A = \pi r^2 \)
Curved surface area of a cylinder: \( A = 2\pi rh \)
Volume of a cylinder: \( V = \pi r^2 h \)
Volume of a triangular prism: \( V = Ah \)

Theorem of Pythagoras:

\[ a^2 + b^2 = c^2 \]

Trigonometric ratios in a right angled triangle:

\[ \tan \theta = \frac{\text{opposite}}{\text{adjacent}} \]
\[ \sin \theta = \frac{\text{opposite}}{\text{hypotenuse}} \]
\[ \cos \theta = \frac{\text{adjacent}}{\text{hypotenuse}} \]

Gradient:

\[ \text{Gradient} = \frac{\text{vertical height}}{\text{horizontal distance}} \]
1. Carry out the following calculations.
   
   (a) \(14.6 - 3.21 + 5.3\)

   (b) \(2.44 \times 90\)

   (c) \(76.8 \div 6\)

   (d) \[\frac{1}{4} + \frac{1}{3}\]
2. Top footballers can earn £27·2 million each year. Write 27·2 million in scientific notation.
3. An amusement arcade has a lighting effect in the shape of triangles with coloured lights attached.

The lighting effect can be assembled in sections as shown below.

(a) Complete the table below.

<table>
<thead>
<tr>
<th>Number of sections ($s$)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of coloured lights ($c$)</td>
<td>6</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(b) Write down a formula for calculating the number of coloured lights ($c$) when you know the number of sections ($s$).

(c) The amusement arcade’s lighting effect uses a total of 116 coloured lights.

How many sections are in the lighting effect?
4. From the numbers 50, 93, 43, 56, 85, 42 choose:

(a) two numbers which are multiples of seven;

(b) the prime number;

(c) the number which is closest to a square number.
5. A website shows some extreme temperatures recorded on Earth.

The highest temperature recorded was 58 °C in Libya in 1922.

The lowest temperature recorded was –64 °C in Siberia in 1973.

Find the difference between these two temperatures.

6. Starting with the smallest, write the following in order.

\[
\frac{1}{5} \quad 0.05 \quad 51\% \quad 0.505 \quad \frac{5}{10}
\]
7. Colin works in a supermarket at the weekend.
   He is paid the basic rate of £7.50 per hour on Saturdays.
   He is paid at time and a half on Sundays.
   Last weekend he worked 7 hours on Saturday and 6 hours on Sunday.

Calculate Colin’s total pay for last weekend.
8. 720 people were at The Venue on Friday.

On Friday, it was only 80% full.

On Saturday, The Venue was full.

How many people were at The Venue on Saturday?
9. Jamie took the overnight sleeper train from Edinburgh to London.

She arrived in London at 0624.

Her journey had taken 6 hours 58 minutes.

When did Jamie’s sleeper train leave Edinburgh?
The diagram above shows a semi-circle with BD as diameter.

- C lies on the circumference
- In triangle BCD, angle CDB is 71°
- AD is a straight line

Calculate the size of the shaded angle ABC.
ADDITIONAL SPACE FOR ANSWERS
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<th>Town</th>
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<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
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<thead>
<tr>
<th>Forename(s)</th>
<th>Surname</th>
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<tbody>
<tr>
<td></td>
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<td>Year</td>
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Gradient:
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1. In the Annual Fun Run, Lucy ran 12 kilometres in 1 hour 15 minutes.
   Calculate her average speed in kilometres per hour.
2. John has drawn this design.

Using a scale factor of 2, draw an enlargement of John’s design on the grid below.
3. Stephen is buying new kitchen cabinets.

<table>
<thead>
<tr>
<th>Kitchen Cabinet Price List</th>
<th>Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabinets</td>
<td>30 cm</td>
</tr>
<tr>
<td>Base</td>
<td>£43</td>
</tr>
<tr>
<td>Wall</td>
<td>£39</td>
</tr>
<tr>
<td>High</td>
<td>£68</td>
</tr>
<tr>
<td>Drawer</td>
<td>£103</td>
</tr>
</tbody>
</table>

He buys:
- three Base cabinets of width 50 centimetres
- two Wall cabinets of width 30 centimetres
- one Drawer cabinet of width 80 centimetres.

Calculate the total cost of his kitchen cabinets.
4. Brian sets out from camp during an expedition. The arrow in the sketch below shows the direction in which he is travelling.

What is the three-figure bearing of this direction?
5. Renvi is tiling her bathroom floor.  
She needs 15 boxes of tiles.  
The price of one box is £23.  
The tile shop has a special offer of “buy one box get one box half price”.  
Renvi makes use of the special offer.  
How much does Renvi pay for 15 boxes of tiles?
6. (a) Complete the table below for $y = 2x - 1$.

<table>
<thead>
<tr>
<th>$x$</th>
<th>-1</th>
<th>1</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(b) Using the table in part (a), draw the graph of the line $y = 2x - 1$ on the grid below.
7. Maggie has bought a garden shed.

The dimensions for one side of the shed are shown in the diagram below.

Calculate the length of ST.

**Do not use a scale drawing.**
8. The cash price of a 3D TV at Curlys Superstore is £1315.

Curlys also has an interest free payment plan.

The payment plan is a deposit plus twelve equal monthly payments.

The deposit for the TV is £175.

Find the cost of the monthly payments.
9. (a) Solve algebraically

\[ 6(2x - 3) = 42. \]

(b) Factorise

\[ 12t + 9u. \]
10. At the World Athletic Championships the mean time for the first semi-final of the 100 metres was 9.98 seconds.

For the second semi-final the times, in seconds, were:


Was the mean time for the second semi-final better than the mean time for the first semi-final?
Give a reason for your answer.
11. The pupils in fourth year at Wanlockhead High School voted in the school election.

The votes for each candidate are given below:

- Eco: 86 votes
- Health: 24 votes
- Fairtrade: 52 votes
- Community: 18 votes

Using a suitable scale, draw a bar chart to show this information.
12. The Olympic symbol consists of five identical circles.

Part of the symbol is shown in the diagram below.
- the length of the symbol is 45 centimetres
- the circles are equally spaced
- the gap between the adjacent circles is 1.5 centimetres.

Calculate the radius of a circle.
13. A surveyor has to calculate the height of a mobile phone mast.

From a point 20 metres from the base of the mast, the angle of elevation to the top is 52°.

Calculate the height of the mobile phone mast.

Round your answer to 1 decimal place.

**Do not use a scale drawing.**
14. Pachuri Sauces are changing the shape of the labels on their jars from circles to squares.

The labels have the same area.

The circle has a radius of 4·5 centimetres.

Calculate the length of the new square label.

[END OF QUESTION PAPER]
ADDITIONAL SPACE FOR ANSWERS
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