INSTRUCTIONS

- Answer all questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do not use an erasable pen or correction fluid.
- Do not write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 56.
- The number of marks for each question or part question is shown in brackets [ ].
1 Zachary asks the 30 students in his class which is their favourite sport. The table shows the results.

<table>
<thead>
<tr>
<th></th>
<th>Netball</th>
<th>Football</th>
<th>Hockey</th>
<th>Tennis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7</td>
<td>12</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

Complete the pictogram.

Key: represents 4 people

2 (a) Find the value of $\sqrt{225}$.

................................................. [1]

(b) Write down the reciprocal of $\frac{2}{3}$.

................................................. [1]

(c) Work out three-quarters of one-third.

................................................. [1]

(d) Work out $-7 - (6 - 8)$.

................................................. [1]
(a) Write down the order of rotational symmetry of this diagram.

..................................................  [1]

(b) On the diagram, draw all the lines of symmetry.  [2]

4 The stem-and-leaf diagram shows the number of hours that each of 16 students studied last week.

<table>
<thead>
<tr>
<th>Key: 1</th>
<th>2 represents 12 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 5 6 8</td>
</tr>
<tr>
<td>2</td>
<td>0 1 1 7 9</td>
</tr>
<tr>
<td>3</td>
<td>2 3 4 5</td>
</tr>
<tr>
<td>4</td>
<td>4 5 7</td>
</tr>
</tbody>
</table>

Find

(a) the median,

.................................................. h [1]

(b) the mode,

.................................................. h [1]

(c) the range.

.................................................. h [1]
5 The volume of a cuboid is $24 \text{ cm}^3$.
The base of the cuboid is 3 cm by 2 cm.

Draw a net of the cuboid on the $1 \text{ cm}^2$ grid.
The travel graph shows a student’s journey.

(a) Explain what is happening between 14:20 and 14:40.

..................................................................................................................................................... [1]

(b) Complete the statement.

The student is travelling fastest between the times .................... and ....................

because ....................................................................................................................................... [2]

7 The probability that a train is late is 0.15.

Write down the probability that the train is not late.

.................................................................................. [1]
8 Nazaneen changes $6500 into 5798 euros at a bank.

Work out the exchange rate the bank uses.

$1 = \ldots \text{ euros} \quad [1]

9 Work out.

(a) \( \begin{pmatrix} 6 \\ -5 \end{pmatrix} + \begin{pmatrix} 8 \\ -1 \end{pmatrix} \)

(b) \( 3 \begin{pmatrix} -4 \\ 7 \end{pmatrix} \)

10

The diagram shows two parallel lines intersected by two straight lines.

Find the values of \(a\), \(b\) and \(c\).

\(a = \ldots \)

\(b = \ldots \)

\(c = \ldots \) \quad [3]
11 (a) Write down the mathematical name for a polygon with 5 sides.

........................................................................  [1]

(b) Work out the interior angle of a regular 18-sided polygon.

........................................................................  [2]

12 The \( n \)th term of a sequence is \( 6n - 4 \).

(a) Write down the first 3 terms in this sequence.

............... , ............ , ............  [1]

(b) The \( k \)th term of this sequence is 422.

Work out the value of \( k \).

\( k = \) .................................................  [2]

13 The radius of a circle is 42 cm.

Work out the circumference of the circle.
Give your answer in terms of \( \pi \).

........................................................................ cm  [2]
14 Change 680000 cm\(^3\) into m\(^3\).

.................................................. m\(^3\)  \[1\]

15 The length, \(l\) metres, of a piece of rope is 5.67 m, correct to the nearest centimetre.

Complete this statement about the value of \(l\).

........................................... \(\leq l < \) .....................................  \[2\]

16 **Without using a calculator**, work out \(\frac{3}{8} - \frac{5}{6}\).

You must show all your working and give your answer as a fraction in its simplest form.

..................................................  \[3\]
17 (a) Write \( \frac{1}{2 \times 2 \times 2 \times 2} \) as a power of 2.

................................. [1]

(b) (i) \( 3^{18} \div 3^t = 3^6 \)

Find the value of \( t \).

\( t = \) ......................................... [1]

(ii) Simplify.

\( 8w^{10} \times 6w^5 \)

................................. [2]

18 Annie invests $8300 at a rate of 5.6% per year compound interest.

Calculate the value of her investment at the end of 6 years.

$ ......................................... [2]

19 Write down an irrational number, \( n \), where \( 31 < n < 32 \).

\( n = \) ......................................... [1]
20 By rounding each number in the calculation correct to 1 significant figure, estimate the value of
\[
\frac{38.7 \times 3.115}{20.3 - 4.1^2}.
\]
You must show all your working.

\[.............................. \quad [2]\]

21 Solve the simultaneous equations.
You must show all your working.
\[
\begin{align*}
2x + y &= 3 \\
x - 5y &= 40
\end{align*}
\]

\[
x = ........................................
\]
\[
y = .............................................. \quad [3]
\]
22 There is a straight road between town $A$ and town $B$ of length 130 km.

Maxi travels from town $A$ to town $B$.
Pippa travels from town $B$ to town $A$.
Both travel at a constant speed of 40 km/h.
Maxi leaves 30 minutes before Pippa.

Work out how far from town $A$ they will be when they pass each other.

............................................ km [4]