DO NOT WRITE ABOVE THIS LINE

INSTRUCTIONS TO CANDIDATES:

Read all the questions carefully before you start answering.

- Answer all questions.
- This paper carries 75 marks.
- Calculators and mathematical instruments are allowed but all necessary working must be shown.

1. a) Round:

i) 17.452 correct to 1 decimal place;
Ans: ___________

ii) 36.198 correct to 2 decimal places.
Ans: ___________

b) \( x \) is any number between 0 and 10. Kane says, “\( x^2 \) is greater than \( x \)”.
Kane’s statement is

A) Always true  B) Never true  C) Sometimes true

Explain: ___________________________________________________________

_________________________________________________________

(4 marks)
2. The distance from the earth to the moon is 374 000 km.

   a) i) Write this distance in metres.
      Ans: __________________ m

   ii) Write 374 000 km in standard form.
      Ans: __________________ km

   b) On a calculator,
      Ryan types: 3 EXP 6 and Alexia types 9 EXP 5
      Who typed the larger number? Explain.
      (4 marks)

3. a) Write these numbers in order, starting from the smallest: 0.5, \(\frac{8}{25}\), \(\frac{2}{5}\).
      Ans: ___________________

   b) Work out, giving your answer as a fraction:
      \[\frac{1}{5} + \frac{2}{3}\]
      Ans: ___________

   c) i) Glasses A, B and C are filled with water. Lucy tries to pour all the water from the glasses into the empty bottle. How much water does not fit into the bottle?
      Ans: __________ litre

   ii) Lucy now tries to pour only two of the glasses into the bottle. Still, not all the water fits into the bottle. These two glasses are _____ and _____.
      (7 marks)
4. The table shows the hours of rain on weekdays in the first two weeks of December.

<table>
<thead>
<tr>
<th>Weekday</th>
<th>Week 1</th>
<th>Week 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>6.3</td>
<td>3.7</td>
</tr>
<tr>
<td>Tuesday</td>
<td>5.4</td>
<td>5.8</td>
</tr>
<tr>
<td>Wednesday</td>
<td>2.0</td>
<td>4.1</td>
</tr>
<tr>
<td>Thursday</td>
<td>4.6</td>
<td>3.9</td>
</tr>
<tr>
<td>Friday</td>
<td>5.4</td>
<td>?</td>
</tr>
</tbody>
</table>

a) Work out the **mean** for Week 1.

Ans: __________

b) The **mode** for Week 1 is __________.

c) The total number of hours of rain for Week 2 was 20 hours. How long did it rain on Friday of Week 2?

Ans: ________

d) Calculate the **median** for Week 2.

Ans: ________

e) Calculate the **range** for Week 2.

Ans: ________

(8 marks)

5. A milkshake recipe requires 300 mℓ of milk, 240 mℓ of ice cream and 60 mℓ of chocolate.

a) Write down and simplify the ratio of milk : ice cream : chocolate.

Ans: ________________

b) How many millilitres of ice cream is needed with 960 mℓ of milk?

Ans: __________ mℓ
c) How many millilitres of each ingredient is needed to make **5.4 litres** of milkshake?

Ans: milk ________ mℓ; ice cream ________ mℓ; chocolate ________ mℓ.

(8 marks)
6. This polygon is called a chevron.

a) Is the polygon regular or irregular?
   Ans: __________

b) The value of the shaded angle can be expressed as \( y + 34 \).
   Work out the value of \( y \).

\[ y = \underline{\phantom{0000}} \]

c) i) Expand: \( 4(2x + 3) \).
   Ans: __________

   ii) The perimeter of the chevron above is 584 cm. Form an equation for \( x \) and solve it.

\[ x = \underline{\phantom{0000}} \] (7 marks)

7. Triangular pools A and B are similar. The length of their base is 13 m and 39 m respectively.

\[ \text{A} \quad \text{B} \]

\[ \begin{align*}
    \text{A} & : \quad 13 \text{ m} \quad 7.1 \text{ m} \\
    \text{B} & : \quad 39 \text{ m} \quad 49.05 \text{ m} \quad 21.3 \text{ m}
\end{align*} \]

Diagrams not to scale

a) Write down and simplify the ratio \( \text{base of A} : \text{base of B} \).
   Ans: _______ : _______

b) Work out the missing length of pool A.
   Ans: __________ m

c) It costs €240.60 to build a pathway around pool A.
   How much does it cost to build a pathway around pool B?
   Ans: €_________ (3 marks)
8. Laura and Greg live in the same house. They ride their bikes to school which is 16 800 m away. Laura takes 40 minutes to arrive to school. Greg travels at a speed of 12.4 m/s.

a) i) Change 40 minutes to seconds.
   Ans: ___________ seconds

   ii) Work out Laura’s average speed in metres/second.
   Ans: ___________ m/s

b) i) How long does Greg’s journey take? Give your answer to the nearest second.
   Ans: ___________ seconds

   ii) Change your last answer to minutes, correct to the nearest minute.
   Ans: ___________ minutes

c) Who arrives first at school and by how many minutes?
   Ans: ___________ arrives first by ___________ minutes

(8 marks)

9. There are 18 000 different types of fish in the world.

a) 47.5% of the different types of fish are found in the Mediterranean. How much is this?
   Ans: ___________ fish

b) People catch only 5580 different types of fish. Express this number as a percentage of the different types of fish in the world.
   Ans: ___________%

c) It is estimated that the 18 000 different types of fish will decrease by 1% by the year 2026. How many different types of fish will there be in 2026?
   Ans: ___________ different types of fish

(7 marks)
10. Number machines A and B produce different outputs to the same input \( n \).

![Number Machine Diagram]

a) Write down the **first term** \((n = 1)\) for Number Machine A.

Ans: __________

b) Write down the **first three terms** for Number Machine B.

Ans: __________

c) Complete:

<table>
<thead>
<tr>
<th>( n )</th>
<th>Output A</th>
<th>( n )</th>
<th>Output B</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>38</td>
<td></td>
<td>42</td>
</tr>
<tr>
<td>62</td>
<td></td>
<td>62</td>
<td></td>
</tr>
</tbody>
</table>

d) For the same input \( n \), what is the **difference** between outputs A and B?

Ans: __________

e) What is the value of Output A when Output B is 158?

Output A = __________

f) Which of the following represents Number Machine A?

A) \((n + 2) \times 4\)       
B) \(n \times (2 + 4)\)       
C) \((n \times 2) + 4\)       

(10 marks)
11. a) Draw a regular nonagon (9 sides) in the circle below.

b) A regular polygon X has its exterior angles equal to 24°.

i) The sum of the exterior angles of any polygon is _________ °.

ii) How many sides does polygon X have?

Ans: _________ sides

iii) What is the size of each interior angle of polygon X?

Ans: _________ °

iv) What is the sum of the interior angles of polygon X?

Ans: ___________ °

(9 marks)