INSTRUCTIONS

Read the following instructions carefully.

1. This paper consists of TWO (2) sections – Sections I and II.
2. There are six (6) questions in Section I and three (3) questions in Section II.
3. Attempt ALL SIX (6) questions in Section I.
4. Answer ANY TWO (2) questions in Section II.
5. Write your answers in the spaces provided in this test booklet.
6. Write proper statements and show all working.
7. If you have finished before time is called, go back and check your work.
8. Remember to complete the following on the cover of your answer booklet:
   - Student’s Name
   - School Name
   - School ID
   - Student’s Number
9. Candidates are permitted to use the following materials:
   - Calculators (non-programmable)
   - Geometry Sets
   - Graph Paper (provided)

NO PROGRAMMABLE CALCULATORS MUST BE USED.

NO CELLPHONE CALCULATORS ARE ALLOWED.
SECTION I

ANSWER ALL QUESTIONS IN THIS SECTION

Write your answers in the spaces provided. Remember to show all working.

1. (a) Calculate the value of $6 \frac{1}{6} - 1 \frac{3}{4}$, expressing your answer as a mixed number.

\[
\frac{37}{6} - \frac{7}{4} = \frac{53}{12} = 4 \frac{5}{12}
\]

[3 marks]

(b) Convert $\frac{3}{8}$ to a percent.

\[
\frac{3}{8} \times \frac{25}{2} = \frac{75}{2} = 37 \frac{1}{2} \%
\]

[2 marks]

(c) Express 7.185 correct to 2 significant figures.

\[
7.19
\]

[1 mark]
2. \[ U = \{ \text{my friends} \} \]
\[ M = \{ \text{friends who are good at Mathematics} \} \]
\[ C = \{ \text{friends who play cricket} \} \]

Use the Venn Diagram to answer the following:

a) i) List all my friends who are good at Mathematics

\[ \{ \text{Michael, Ann, Nick, Mervin, Errol} \} \]  

ii) How many of my friends play cricket ONLY? \[ 4 \]  

b) i) How many of my friends are neither good at Math nor play cricket? \[ 1 \]  

ii) What is the probability that my friends are neither good at Mathematics nor play cricket? \[ \frac{1}{10} \]  

c) What is the probability that my friends are good at Math and play cricket? \[ \frac{3}{10} \]
3. (a) Simplify the following expressions:

(i) \[ 6m - 2p - 3m + 4p \]
\[ = 6m - 3m - 2p + 4p \]
\[ = 3m + 2p \] [1 mark]

(ii) \[ 3x (5x - 5) - 4x^2 \]
\[ = 15x^2 - 15x - 4x^2 \]
\[ = 15x^2 - 4x^2 - 15x \]
\[ = 11x^2 - 15x \]
\[ = x(11x - 15) \] [2 marks]

(b) Factorize completely

(i) \[30 + 24p \]
\[ = 6(5 + 4p) \] [1 mark]

(ii) \[ 6p^2 + 19p + 15 \]
\[ = 6p^2 + 9p + 10p + 15 \]
\[ = 3p(2p + 3) + 5(2p + 3) \]
\[ = (2p + 3)(3p + 5) \] [2 marks]
4. Cuboid-shaped boxes will be loaded onto a shipping container. The shipping container is in the shape of a rectangular cuboid. The edges of each box measure 2.5 m by 1 m by 1 m and the dimensions of the shipping container are 5 m by 2 m by 3 m, as shown below (not drawn to scale).

(a) What is the volume in cubic metres, of a box? 

\[ \text{volume} = \text{length} \times \text{width} \times \text{height} \] 

\[ = 2.5 \times 1 \times 1 = 2.5 \text{ m}^3 \]

(b) Determine the number of boxes that will completely fill the shipping container. 

Volume of shipping container = 5 \times 2 \times 3 = 30 \text{ m}^3 

Volume of each box = 2.5 \text{ m}^3 

No. of boxes that will fill shipping container = \( \frac{30}{2.5} = 12 \)

(c) Convert the volume of a box from cubic metres to cubic centimetres. 

\[ 1 \text{ m}^3 = 1,000,000 \text{ cm}^3 \]

\[ 2.5 \text{ m}^3 = 2.5 \times 1,000,000 \text{ cm}^3 = 2,500,000 \text{ cm}^3 \]

OR

\[ 1 \text{ m} = 100 \text{ cm} \]

\[ 1 \text{ m}^3 = (100 \text{ cm})^3 = 100^3 \text{ cm}^3 = 100 \times 100 \times 100 \text{ cm}^3 \]

\[ 1 \text{ m}^3 = 1,000,000 \text{ cm}^3 \]
5. The quadrilateral ABCD is shown in the diagram.

(a) ABCD is translated under \( \begin{pmatrix} 6 \\ 9 \end{pmatrix} \) to produce its image A'B'C'D'.

Draw and label the image A'B'C'D' on the diagram below. [4 marks]

(b) Draw the lines of symmetry for A'B'C'D' on the diagram above. [2 marks]
6. The following list shows the number of occupants in each of 25 cars travelling towards Port of Spain. The number of occupants for each car passing the light house was recorded during a 2 minute period.

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>2</th>
<th>5</th>
<th>4</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

(a) Using the data given, complete the frequency table below. [2 marks]

<table>
<thead>
<tr>
<th>Number of occupants per car</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>II</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>HHH</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>HHH</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>HHH</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>HII</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>I</td>
<td>1</td>
</tr>
</tbody>
</table>

(b) What is the modal number of occupants per car? [1 mark]

2

(c) Calculate the mean number of occupants per car. [3 marks]

\[
\frac{(1 \times 2) + (2 \times 9) + (3 \times 6) + (4 \times 4) + (5 \times 3) + (6 \times 1)}{25} = \frac{2 + 18 + 18 + 16 + 15 + 6}{25} = \frac{75}{25} = 3
\]
SECTION II

ANSWER TWO (2) QUESTIONS ONLY FROM THIS SECTION

7. (a) An art dealer wishes to buy a painting online from France. He has to pay in euros (€). The exchange rate is TT$1.00 = € 0.125.

i) Convert € 1 to TT dollars.

\[ \frac{0.125}{1} = \frac{1}{0.125} = 1 \div \frac{1}{8} = 1 \times \frac{8}{1} = 8 \]

\[ \text{TT} \$ 8.00 \] [1 mark]

ii) If the painting costs € 250 000, then what is the cost in TT?

\[ 250 000 = 250 000 \times 8 \]

\[ = \text{TT} \$ 2,000,000 \] [2 marks]

(b) Mary invests $12 000 at a bank which pays 3% simple interest. After a certain number of years, the total amount she receives is $15 240.

i) How much interest did Mary receive?

\[ 15 240 - 12 000 = 3 240 \] [1 mark]

ii) Calculate the number of years in which Mary invested her money at the bank

\[ \text{Simple Interest} = \frac{\text{Principal} \times \text{Rate} \times \text{Time}}{100} \]

\[ \text{Time} = \frac{15240 \times \text{Simple Interest}}{\text{Principal} \times \text{Rate}} \]

\[ = \frac{15240 \times 3.240}{12000 \times 3} \]

\[ = 9 \text{ years} \] [2 marks]
7. (b) Use a compass, ruler and pencil only. Show all construction lines.

(i) Construct an isosceles triangle ABC such that $AB = AC = 5.8$ cm and angle $BAC = 90^\circ$. Measure and write down the length of $BC$ to 1 decimal place. [3 marks]

(ii) Construct an angle $PQR = 60^\circ$ [3 marks]
8. (a) A bird is on the ground 12m from the base of a tree. It flies directly to the top of a tree which is 5m tall (not drawn to scale).

(i) Calculate the distance, $y$, flown by the bird.

\[
y^2 = 12^2 + 5^2
\]
\[
= 144 + 25
\]
\[
= 169
\]
\[
y = \sqrt{169}
\]
\[
= 13 \text{ m}
\]

(ii) Calculate the value of angle $x$ as shown in the diagram above correct to 2 decimal places.

\[
\sin(x) = \frac{5}{13}
\]
\[
x = \sin^{-1} \left( \frac{5}{13} \right)
\]
\[
= 22.62^\circ
\]
8. (b) Alain’s plane departs Piarco International Airport (POS), Trinidad at 2:35 p.m. and arrives at the Arthur Napoleon Raymond Robinson International Airport (TAB), Tobago at 3:05 p.m. The distance between the airports is 83 km.

(i) Calculate the actual distance, in centimetres, between the two airports. (Use scale: 1 cm represents 10 km).

\[ 1 \text{ km} = 100,000 \text{ cm} \]
\[ 83 \text{ km} = 8300000 \text{ cm} \]
\[ \text{or } 8.3 \times 10^6 \text{ cm} \]

(ii) What is the distance between the two airports, in metres?

\[ 1 \text{ km} = 1000 \text{ m} \]
\[ 83 \text{ km} = 83000 \text{ m} \]
\[ \text{or } 8.3 \times 10^4 \text{ m} \]

(iii) How many minutes did Alain take to arrive at the Arthur Napoleon Raymond Robinson International Airport?

30 min

(iv) How long did Alain take to arrive at Arthur Napoleon Raymond Robinson International Airport, in hours?

\[ \frac{1}{2} \text{ hr.} \]

(v) What is the average speed of the airplane, in kilometres per hour, from Piarco International Airport to Arthur Napoleon Raymond Robinson International Airport?

\[ \text{speed} = \frac{\text{distance}}{\text{time}} = \frac{83 \text{ km}}{\frac{1}{2} \text{ hr}} \]
\[ 83 \times 2 = 166 \text{ km/hr} \]
\[ \text{or } 166 \text{ km/h}^{-1} \]
9. (a) The number of cups of coffee and pieces of cake bought by Indra and Carol, and the amounts each spent are shown below.

<table>
<thead>
<tr>
<th></th>
<th>Coffee</th>
<th>Cake</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indra</td>
<td>☕️ ☕️ ☕️</td>
<td>🍰</td>
<td>$12.00</td>
</tr>
<tr>
<td>Carol</td>
<td>☕️ ☕️</td>
<td>🍰 🍰</td>
<td>$13.00</td>
</tr>
</tbody>
</table>

Use \( x \) to represent the cost in dollars of one cup of coffee and \( y \) to represent the cost in dollars of one piece of cake.

(i) Write an equation using \( x \) and \( y \) to represent the total cost of the cups of coffee and pieces of cake Indra bought.

\[
3x + 2y = 12
\]  
[2 marks]

(ii) Determine the cost of:
- 1 piece of cake
- 1 cup of coffee

\[
\begin{align*}
3x + 2y &= 12 \quad \text{(1)} \\
2x + 3y &= 13 \quad \text{(2)} \\
\text{\( \times 2 \) and \( \times 3 \)}
\end{align*}
\]

\[
\begin{align*}
6x + 4y &= 24 \quad \text{(3)} \\
6x + 9y &= 39 \quad \text{(4)} \\
\text{\( \text{4} - \text{3} \)}
\end{align*}
\]

\[
\begin{align*}
5y &= 15 \\
y &= \frac{15}{5} \\
&= 3
\end{align*}
\]

Substitute \( y = 3 \) into \( \text{(1)} \):

\[
\begin{align*}
3x + 2(3) &= 12 \\
3x + 6 &= 12 \\
3x &= 12 - 6 \\
3x &= 6 \\
x &= \frac{6}{3} \\
&= 2
\end{align*}
\]
[4 marks]

1 piece of cake costs \$3.00,
1 cup of coffee costs \$2.00
9. (b) The equation \( y = 2x + 1 \) gives the relationship between \( x \) and \( y \).

(i) Use the equation to complete the table.

<table>
<thead>
<tr>
<th>( x )</th>
<th>0</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>1</td>
<td>5</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>

(ii) Using the grid provided, draw the graph of \( y = 2x + 1 \). [2 marks]

(iii) State the coordinates of the \( y \) intercept for the graph \( y = 2x + 1 \). [2 marks]

\[(0, 1)\]