Instructions to Candidates

- Answer all questions.

- This paper carries a total of 20 marks.

- Calculators and protractors are NOT ALLOWED.
1. Consider the following data:
   1, 7, 8, 8, 12, 16, 17, 19, 20
Which one of the following statements is not true?
(A) Median = 12  (B) Mode = 8  (C) Range = 19  (D) Mean = 11
Ans:_______________

2. Use this graph to find the value of x when y = -4.

![Graph](image)

Ans:_______________

3. Which expression gives the volume of the cylinder?
   (A) \( \pi \times 5^2 \times 16 \)  (B) \( \pi \times 8^2 \times 5 \)  (C) \( \pi \times 10^2 \times 16 \)  (D) \( \pi \times 8^2 \times 10 \)

   Ans:_______________

4. Draw the reflection of shape A in the line \( y = -x \).
   ![Reflection Diagram](image)
<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Write as a single number in index form: (23^5 \div 23^6)</td>
<td>Ans: (\quad)</td>
</tr>
<tr>
<td>6</td>
<td>The area of the unshaded sector is 350 cm(^2). Calculate the area of the shaded sector.</td>
<td>Ans: (\quad) cm(^2)</td>
</tr>
<tr>
<td>7</td>
<td>Which one of the following statements is correct?</td>
<td>Ans: (\quad)</td>
</tr>
<tr>
<td></td>
<td>(A) (x = 40, \ y = 80)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(B) (x = 40, \ y = 70)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(C) (x = 80, \ y = 50)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(D) (x = 40, \ y = 50)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Expand: (5(9 + 4x))</td>
<td>Ans: (\quad)</td>
</tr>
<tr>
<td>9</td>
<td>A red light flashes every 8 seconds and a green light flashes every 6 seconds. Kyle sees the red and green lights flash at the same time. After how many seconds will he next see them flash together again?</td>
<td>Ans: (\quad)</td>
</tr>
<tr>
<td>10</td>
<td>Work out: (7 \div 3 - 2 \frac{1}{2})</td>
<td>Ans: (\quad)</td>
</tr>
<tr>
<td>11</td>
<td>Which one of the following is the best approximation for (x)?</td>
<td>Ans: (\quad)</td>
</tr>
<tr>
<td></td>
<td>(A) 5 cm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(B) 7 cm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(C) 9 cm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(D) 10 cm</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>If (A \times \frac{1}{9} = 1), what is the value of (A)?</td>
<td>Ans: (\quad)</td>
</tr>
<tr>
<td>13</td>
<td>Write (4.06 \times 10^3) as an ordinary number.</td>
<td>Ans: (\quad)</td>
</tr>
</tbody>
</table>
14. How many square centimetres are there in 1 m\(^2\)?
   \[\text{Ans: } \hspace{1cm} \text{cm}^2\]

15. Manuela has a music collection of 600 songs. The songs are stored on her computer, MP3 player and CDs in the ratio 2 : 3 : 5. How many songs are stored on her MP3 player?
   \[\text{Ans: } \hspace{1cm} \text{songs}\]

16. A map scale is 1 : 100 000. What real length, in km, is represented by a length of 4 cm on the map?
   \[\text{Ans: } \hspace{1cm} \text{km}\]

17. What is the sum of the interior angles of an octagon?
   \[\text{Ans: } \hspace{1cm} \text{degrees}\]

18. Use your ruler to take the necessary measurements to find the value of \(\tan x^\circ\). Give your answer as a fraction.
   \[\text{Ans: } \hspace{1cm} \text{fraction}\]

19. Three billiard balls numbered 3, 4 and 5 are placed in each of two hats. One ball is chosen at random from each hat. Which is the most likely sum of the two balls chosen?
   \(\text{(A) 6} \quad \text{(B) 7} \quad \text{(C) 8} \quad \text{(D) 9} \quad \text{(E) 10}\)
   \[\text{Ans: } \hspace{1cm} \text{sum}\]

20. What is the Maximum value of \(y\)?
   \[\text{Ans: } \hspace{1cm} \text{value}\]
1. Nigel’s car holds 58 litres of petrol when full.

   a) He travelled 640 km on 40 litres of petrol. How many kilometres did Nigel travel on 1 litre of petrol?

   Ans: ___________ km

   b) How many kilometres would Nigel expect to travel with a full tank of petrol?

   Ans: ___________ km

   c) How many litres of petrol would he expect to use to cover 200 km?

   Ans: ___________ ℓ

   (6 marks)
2. A factory produces paper clips. They checked the contents of 150 boxes. The data is in this table.

<table>
<thead>
<tr>
<th>Number of paper clips in box</th>
<th>Number of boxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>98</td>
<td>14</td>
</tr>
<tr>
<td>99</td>
<td>22</td>
</tr>
<tr>
<td>100</td>
<td>41</td>
</tr>
<tr>
<td>101</td>
<td>33</td>
</tr>
<tr>
<td>102</td>
<td>30</td>
</tr>
<tr>
<td>103</td>
<td>10</td>
</tr>
</tbody>
</table>

(a) Find the range.

Ans: ______________

(b) Calculate the mean number of paper clips in a box, giving your answer correct to 1 decimal place.

Ans: ______________

(5 marks)
3. Line AC is parallel to the $x$-axis and line BC is parallel to the $y$-axis.

A $(-3, -2)$  
B $(4, 2)$

a) Fill in the coordinates of point C.

b) How long is AC?

Ans: _______ units

c) How long is BC?

Ans: _______ units

d) Calculate the length of AB, giving your answer correct to 2 significant figures.

Ans: _______ units

(6 marks)
4. Two equal circles fit exactly inside a rectangular piece of cardboard of length 28 cm as shown in the diagram.

\[ \text{b cm} \]
\[ \overline{28 \text{ cm}} \]

a) Write down the value of \( b \).

Ans: _____________

b) Calculate the area of the rectangle.

Ans: __________cm²

c) What is the radius of each circle?

Ans: __________cm

d) Calculate the area of the two circles, giving your answer correct to 2 significant figures.

Ans: __________cm²

e) Calculate the shaded area correct to 2 significant figures.

Ans: __________cm²

(9 marks)
A fire escape ladder is mounted on a fire engine 2.8 m above the ground. The ladder is 27 m long and makes an angle of 14° with the vertical. The ladder touches the building at B, 3.5 m from the top of the building.

Calculate in metres, correct to 1 decimal place:

a) the distance AC

Ans:__________m

b) the height of the building.

Ans__________m

(8 marks)
6.  
a) A bullet reaches a target 150 m away in 0.75 seconds. Calculate the speed of the bullet in m/s.

   Ans: ________ m/s

b) An aeroplane flies at a steady speed of 448 km/h. How long does it take to travel 1120 km?

   Ans: ________ hours

c) A ship is cruising at a steady speed of 20 km/h. How far does it travel in 45 minutes?

   Ans: _________ km

(7 marks)

7. Jeremy writes the LOGO program below to draw the pentagon shown. Each side is 70 turtle steps long. However, one of the commands is incorrect.

   PD  
   FD 70  
   RT 30 
   FD 70  
   RT 120 
   FD 70  
   LT 150 
   FD 70  
   HOME

a) Underline the incorrect command.

b) What is the correct command that Jeremy should use?

   Ans: ________

(2 marks)
8.

a) Translate the circle by the vector \( \begin{pmatrix} 9 \\ -6 \end{pmatrix} \).

b) Rotate the square 180° about point P.

c) Draw the enlargement of the hexagon by scale factor 2 using point Q as the centre of enlargement.
9.

a) Factorise completely: $6ab + 12a^2$

Ans: ______________

b) Solve the equation: $2(x + 3) + 4x = 36$

Ans: $x = _________$

c) Simplify: $\frac{7x}{3} + \frac{x-3}{6}$

Ans: ______________

(8 marks)
10. 

a) A number $S$ is equal to the **sum** of **half** a number $b$ and **three times** a number $c$. 

i) Write down a formula for $S$ in terms of $b$ and $c$. 

Ans: $S = \underline{\quad}$  

ii) Find the value of $S$ when $b = 6$ and $c = 7$. 

Ans: $S = \underline{\quad}$  

b) 

i) Rearrange the formula $t = 8k - 9$ to make $k$ the subject of the formula. 

Ans: $k = \underline{\quad}$  

ii) Find $k$ when $t = 27$. 

Ans: $k = \underline{\quad}$  

(7 marks)
11. 

a) Consider this pattern.
\[ 5^3 - 4^3 = 5^2 + 5 \times 4 + 4^2 = 61 \]
\[ 6^3 - 5^3 = 6^2 + 6 \times 5 + 5^2 = 91 \]
\[ 7^3 - 6^3 = 7^2 + 7 \times 6 + 6^2 = 127 \]

Use this pattern to complete:
\[ 10^3 - 9^3 = \square + \square \times \square + \square = \square \]

b) Consider this pattern. Each pentagon is of side 1 cm.

(i) Write down in the spaces provided, the **perimeter** of each shape.

![Perimeter of pentagons]

(ii) If \( n \) is the number of pentagons, underline the expression which gives the **perimeter** of each shape in centimetres.

(A) \( 5n \) \hspace{1cm} (B) \( n + 6 \) \hspace{1cm} (C) \( 2n + 3 \) \hspace{1cm} (D) \( 3n + 2 \)

c) These designs are made by arranging branches in trees.

<table>
<thead>
<tr>
<th>1(^{st}) tree</th>
<th>2(^{nd}) tree</th>
<th>3(^{rd}) tree</th>
<th>4(^{th}) tree</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="1st tree" /></td>
<td><img src="image2" alt="2nd tree" /></td>
<td><img src="image3" alt="3rd tree" /></td>
<td><img src="image4" alt="4th tree" /></td>
</tr>
</tbody>
</table>

1 branch \hspace{1cm} 3 branches \hspace{1cm} 7 branches \hspace{1cm} 15 branches

How many branches would be in the 6\(^{th}\) tree?

Ans: \( \square \) branches

(6 marks)
12. Mr Grima has a bag that contains 12 coloured marbles. He takes a marble out of the bag at random, records its colour, and puts it back into the bag. He does this 60 times.

This table shows his results.

<table>
<thead>
<tr>
<th>Marble Colour</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>30</td>
</tr>
<tr>
<td>Red</td>
<td>20</td>
</tr>
<tr>
<td>Yellow</td>
<td>10</td>
</tr>
</tbody>
</table>

a) Use the results in the table to estimate the number of blue marbles in the bag.

Ans: _____ blue marbles

b) Mr Grima takes another marble out of the bag. Estimate the probability that the marble:

i) is yellow.

Ans: \( P(\text{yellow}) = \) _____

ii) is not red.

Ans: \( P(\text{Not red}) = \) _____

(5 marks)
13. The diagram shows the position of three lighthouses R, S and T at sea. S is 22 km and on a bearing of 036° from R and T is 16 km and on a bearing of 140° from S.

**Diagram Not to Scale**

![Diagram](image)

**a)** Calculate \( \angle RST \).

Ans: ___________

**b)** Draw an accurate scale drawing to show the exact positions of the three lighthouses taking 1 cm to represent 2 km. Part of the drawing has been done for you.

***Diagram***

**c)** What is the actual distance between the buoys R and T, giving your answer correct to the nearest kilometre?

Ans: __________ km

(5 marks)