**Annual Examinations for Secondary Schools 2014**

**FORM 3**  
**MATHEMATICS**  
**Non Calculator Paper**

<table>
<thead>
<tr>
<th>Name: ______________________________</th>
<th>Class: ____________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>Mark</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Total</th>
</tr>
</thead>
</table>

**Instructions to Candidates**

- Answer ALL questions.
- This paper carries a total of 25 marks.
- Calculators and protractors are NOT ALLOWED.
1. a) Draw lines to join all the pairs of equal capacities.

b) What is the total capacity of 3 soft drinks and one bottle of fruit juice?
   Give your answer in litres and millilitres.

   Ans: _____l _______ml
   [4 marks]

2. Sonia arrived 12 minutes late for a meeting.
   The meeting was 1 hour 45 minutes long and finished at 11:50 a.m.
   At what time did Sonia arrive for the meeting?

   Ans: _______________
   [2 marks]

3. Arrange the numbers 1, 2, 3 and 4 in the spaces below to make the equation true.
   Use each number only once.

   [1 mark]
4. a) Look at the thermometer below.

```
-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 °C
```

i. What will the thermometer show when the temperature increases by 3 °C?
   Ans: _________°C

ii. What will the thermometer show when the temperature decreases by 5 °C?
   Ans: _________°C

b) Work out:  \( 8 - (-9) = \) ___________________

c) The rule of the following puzzle is that the numbers in the circles are multiplied to give the number in the rectangle between them, as in the example below.

```
2  8  4
```

Fill in the missing numbers in the puzzle below.

```
*  -6  -3
10
5
*  -9
```

[6 marks]

5. In a supermarket tins are stacked as shown on the right.

a) When a stack is 10 rows high, how many tins will there be in the bottom row?
   Ans: ________tins

b) What is the total number of tins in a stack of 10 rows?
   Ans: ________tins

[3 marks]
6. An estimate of the circumference of a circle with diameter 9.8 cm is:
   (A) 20 cm  (B) 30 cm  (C) 100 cm
   Ans: _______
   [1 mark]

7. Work out $8 \times \frac{2}{7}$, giving your answer as a mixed number.
   Ans: _______
   [2 marks]

8. A LOGO turtle is given the following commands to draw a triangle.
   \[
   \text{PD RT45 FD60 RT90 FD60 HOME}
   \]
   Which of the following does not describe the triangle that the turtle draws?
   (A) Right-Angled Triangle  (B) Equilateral Triangle  (C) Isosceles Triangle
   Ans: _______
   [1 mark]

9. A shop sells three different sized bottles of lemonade.
   \[
   \begin{align*}
   &1\text{l} \quad \text{€0.39} \\
   &\frac{3}{2}\text{l} \quad \text{€0.55} \\
   &2\text{l} \quad \text{€0.70}
   \end{align*}
   \]
   a) There are three ways of buying exactly 3 litres of lemonade.
   Complete the table below to calculate the cost of each of the 3 different ways.
   The first one has been done for you.

<table>
<thead>
<tr>
<th>Way to buy 3 litres of Lemonade</th>
<th>Calculation</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two $\frac{3}{2}\text{l}$ bottles</td>
<td>€0.55 \times 2</td>
<td>€1.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   b) What is the cheapest cost of buying exactly 3 litres of lemonade?
   Ans: €___________
   [5 marks]
1. Jenny made this map of the landmarks in her town.

![Map of landmarks](image)

a) Name the landmark that is Northwest of the Theatre. Ans: _____________

b) Which building is on a bearing of 135° from the school? Ans: _____________

[2 marks]
2. a) Planet Earth is $1.5 \times 10^8$ km away from the Sun.  
Write this distance as an ordinary number.

Answer: ______________________ km

b) A group of 7 friends share a restaurant bill **equally** among them.  
They work out the calculation on their calculators and round the answer correct to 2 decimal places.  
The cost of their meal is €58.36.

i. How much does each one of them pay?

Answer: €____________

ii. Explain why they chose to correct the answer to 2 decimal places and not to 2 significant figures.

________________________________________________________________________

[4 marks]

3. Some numbers are sorted in a two-way table, as shown below.

<table>
<thead>
<tr>
<th></th>
<th>Odd</th>
<th>Even</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smaller than 30</td>
<td>11 17 23 3</td>
<td>26 24 6 4 12</td>
</tr>
<tr>
<td></td>
<td>13 15 19 7</td>
<td>22 4</td>
</tr>
<tr>
<td>Greater than 30</td>
<td>51 41 71 63 31</td>
<td>56 64 42 70 32</td>
</tr>
<tr>
<td></td>
<td>35 37 39</td>
<td>48 52 32</td>
</tr>
</tbody>
</table>

A number is chosen at random from all these numbers.  Find the probability that:

a) the number is smaller than 30.  
   Answer: ____________

b) the number is even.  
   Answer: ____________

c) the number is odd and greater than 30.  
   Answer: ____________

[3 marks]
4. a) i. Calculate the price per kg of each jar of jam.

Ans: € _______________  Ans: € _______________

ii. Write down and simplify the ratio:

price per kg of smaller jar : price per kg of larger jar

Ans: _____ : _____

b) Julie needs to buy batteries for her radio.

A packet of 4 batteries costs €1.50.
A packet of 12 batteries costs €4.80.

Which packet gives the better value? Explain your answer.

[5 marks]
5. a) Underline the correct answer.

The size of an exterior angle of a regular hexagon is:

(A) 60°  (B) 100°  (C) 360°

b) Calculate the size of the angle marked $x$ in the following polygon.

\[
\begin{array}{c}
55° \\
63° \\
11° \\
85° \\
x\
\end{array}
\]

Ans: $x = \underline{}$

[4 marks]

6. In a Brick Wall, each brick shows the sum of the two bricks below it.

Example:

\[
\begin{array}{c|c}
x + 3 \\
x \\
\hline
\end{array}
\begin{array}{c|c}
3 \\
\end{array}
\]

a) Fill in the empty bricks below.

\[
\begin{array}{c|c}
5x + y \\
\hline
y \\
\end{array}
\begin{array}{c|c}
2x - 3y \\
2x - 4y \\
\end{array}
\]

b) Work out the value of $x$ in the Brick Wall below.

\[
\begin{array}{c|c|c}
11 \\
\hline
x - 3 \\
5 \\
\end{array}
\]

Ans: $x = \underline{}$

[5 marks]
7. Alice is a tourist guide. The line graph below shows the tourists’ journey in Valletta.

![Line Graph]

a) Which is the first street that Alice takes the tourists to? What time do they get there?

Ans: __________________, __________________

b) Which is the last street that they visit?

Ans: __________________

c) How far is Merchant Street from Republic Street? Ans: ________________ m

d) What do you think the tourists do between 10:15 am and 10:30 am?

________________________________________

________________________________________

e) What time do Alice and the tourists get back to the tourists’ office?

Ans: __________________

[7 marks]
8. **SPECIAL OFFER**
Buy 2 items and get 40% off the cheaper one.

Jane buys a skirt and a pair of gloves.

a) Work out 40% of the price of the cheaper item that Jane buys.

 Ans: €___________

b) Using the offer, how much does Jane spend in all?

 Ans: €___________

[5 marks]

9. Fill in the blanks:

a) \(4(3 + 2x) = 12 + \square\)

b) \(18 - 12x = 6(3 - \square)\)

c) \(36x + 24 = \square(3x + 2)\)

d) \(10x - \square = \square(5x - 8)\)

[5 marks]
10. a) Fill in the empty circles using the following number machine.

<table>
<thead>
<tr>
<th>Input</th>
<th>Multiply by 2</th>
<th>Add 1</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x$</td>
<td></td>
<td></td>
<td>$y$</td>
</tr>
<tr>
<td>$-2$</td>
<td></td>
<td></td>
<td>$-3$</td>
</tr>
<tr>
<td>$-1$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$3$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b) Write all inputs and outputs in the form $(x, y)$ in the coordinates column.

c) **Plot** the coordinates

on the grid and **join**

the points with a

straight line.

d) Use your graph to find the value of $y$ when $x = 2.5$.  

Ans: $y = \underline{\phantom{0}}$

e) On your graph mark the $y$-intercept with an arrow ($\rightarrow$).

[8 marks]
11. a) Maya measures the heights of 20 plants. The heights are given below.

<table>
<thead>
<tr>
<th>Height (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 cm</td>
</tr>
<tr>
<td>23 cm</td>
</tr>
<tr>
<td>12 cm</td>
</tr>
<tr>
<td>27 cm</td>
</tr>
<tr>
<td>32 cm</td>
</tr>
<tr>
<td>12 cm</td>
</tr>
<tr>
<td>34 cm</td>
</tr>
<tr>
<td>37 cm</td>
</tr>
<tr>
<td>14 cm</td>
</tr>
<tr>
<td>9 cm</td>
</tr>
<tr>
<td>8 cm</td>
</tr>
<tr>
<td>15 cm</td>
</tr>
<tr>
<td>36 cm</td>
</tr>
<tr>
<td>32 cm</td>
</tr>
<tr>
<td>27 cm</td>
</tr>
<tr>
<td>25 cm</td>
</tr>
<tr>
<td>22 cm</td>
</tr>
<tr>
<td>25 cm</td>
</tr>
<tr>
<td>7 cm</td>
</tr>
<tr>
<td>13 cm</td>
</tr>
</tbody>
</table>

i. Work out the **mean** height of the plants. Give your answer correct to 1 decimal place.

Ans: __________ cm

ii. Calculate the **range** of all the heights.

Ans: __________ cm

iii. Complete the following frequency table for the above heights.

<table>
<thead>
<tr>
<th>Height (cm)</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 – 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 – 30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31 – 40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

iv. Use the grouped frequency table to draw a bar chart on the grid provided.

b) Maya needs to know which is the most common **type** of plant. Which of the following should she use?

(A) median  (B) mode  (C) mean

Ans: __________

[9 marks]
12. A vertical flag pole XY is 5 m long.
Point Z on the ground is 12 m away from the foot of the pole, as shown in the diagram.

a) On the line above, using ruler and compasses only, draw an angle of 90° at Y.
b) Using 1 cm = 1 m, complete the scale drawing of the information above.
c) Use your scale drawing to find the real distance XZ. Ans: __________ m
d) On your scale drawing mark the angle of elevation of X from Z.
e) Measure the angle of elevation of X from Z. Ans: ____________

[7 marks]

13. The cooking time, in minutes, for any number of potatoes is calculated by the rule:

\[ \text{Cooking time (T)} = \text{seven times the number of potatoes (n), then add 3}. \]

a) Underline the correct equation for the cooking time.
   
   \[ (A) \quad 7T = n + 3 \quad \quad (B) \quad T = n + 3 \quad \quad (C) \quad T = 7n + 3 \]

b) How many potatoes take 45 minutes to cook?

Ans: \( n = \) ______ potatoes

[3 marks]
14. Alex is building a box to make a Jack-in-the-Box toy. 
The box is 22.5 cm long, 20.8 cm wide and 16.2 cm high.

a) Calculate the volume of the box.

Ans: _____________ cm$^3$

b) The box has a lid as shown in the diagram.
   Calculate the area of the lid.

Ans: _____________ cm$^2$

c) Alex decorates the box with a red circle on each of the 4 sides of the box.
   Each circle has a radius of 7.3 cm.
   Find the total area that Alex paints in red. Give your answer correct to the nearest whole number.

Ans: _____________ cm$^2$

[8 marks]