

**Saint Ignatius College**  
**Girls' Junior Lyceum**  
**BLATA L-BAJDA**  
**HALF YEARLY EXAMINATIONS 2010**

**FORM 3**

**MATHEMATICS SCHEME A**

**TIME: 1 hour 30 min**

**Main Paper**

Name: \_\_\_\_\_

Class: \_\_\_\_\_ Set: \_\_\_\_\_

| Non Calculator | Main Paper | TOTAL |
|----------------|------------|-------|
|                |            |       |

**CALCULATORS ARE ALLOWED BUT ALL NECESSARY WORKING MUST BE SHOWN**

**ANSWER ALL QUESTIONS**

1. Simplify:

(a)  $3x^2 - 7y + 5x^2 + 2y$

**Ans:** \_\_\_\_\_

(b)  $4p^2 \times 2p$

**Ans:** \_\_\_\_\_

(c)  $\frac{15m^2t}{5mt}$

**Ans:** \_\_\_\_\_

(d)  $(3u^2)^3$

**Ans:** \_\_\_\_\_

(4 marks)

2. (a) Here is a part of a newspaper report about wild life in a country in Africa.

“The number of gorillas has fallen by 80% in the last ten years.

Only about 5000 gorillas **are left**”

About how many gorillas were there in the country ten years ago?

**Ans:** \_\_\_\_\_

(b) (i) Write these numbers in order of size starting with the **smallest**

$$4.5 \times 10^{-2}, \quad 8.6 \times 10^{-3}, \quad 2.8 \times 10^{-4}, \quad 1.7 \times 10^{-3}, \quad 3.5 \times 10^{-2}$$

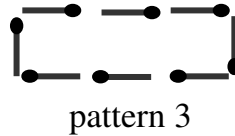
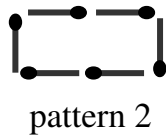
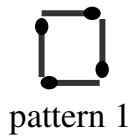
**Ans:** \_\_\_\_\_

(ii) A spaceship travelled for  $6 \times 10^2$  hours at a speed of  $8 \times 10^4$  km/hr. Work out the distance travelled by the spaceship. Give your **answer in standard form**.

**Ans:** \_\_\_\_\_ km

(6 marks)

3. This is a sequence of matchstick patterns.



(a) For the sequence above complete the table.

| Pattern Number        | 1 | 2 | 3 | 4 | 5 |
|-----------------------|---|---|---|---|---|
| Number of matchsticks |   |   |   |   |   |

(b) How many matchsticks are there in the ***n*th** pattern?

**Ans:** \_\_\_\_\_

(c) Find the number of matchsticks in the **50th** pattern.

**Ans:** \_\_\_\_\_

(6 marks)

4. (a) Factorise:  $8x^3 + 12x^2$

**Ans:** \_\_\_\_\_

(b) Expand and simplify:

(i)  $(x - 3)(x + 5)$

**Ans:** \_\_\_\_\_

(ii)  $(y - 6)^2$

**Ans:** \_\_\_\_\_

(5 marks)

Name: \_\_\_\_\_

Class: \_\_\_\_\_

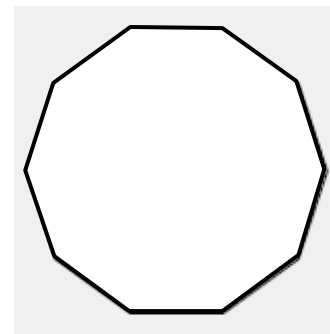
Set: \_\_\_\_\_

5. (a) The diagram shows a **regular decagon**.

Complete:

(i) The **exterior** angles add up to \_\_\_\_\_ degrees.

(ii) The decagon is regular, so each **interior** angle is \_\_\_\_\_ degrees.



(b) Work out the value of:

(i)  $x$

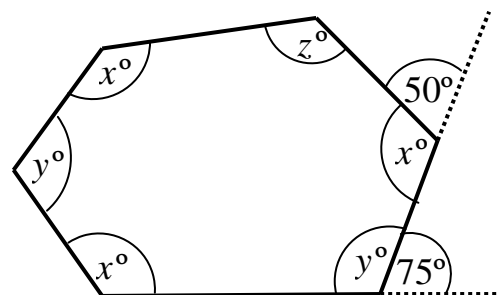
Answer:  $x =$  \_\_\_\_\_

(ii)  $y$

Answer:  $y =$  \_\_\_\_\_

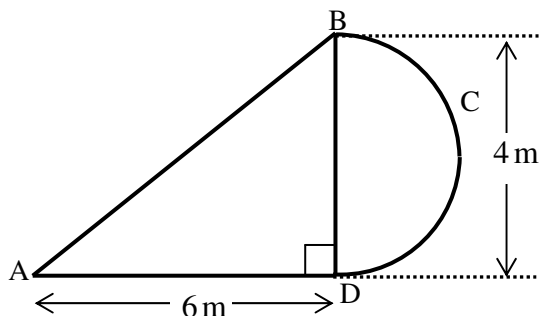
(iii)  $z$

Answer:  $z =$  \_\_\_\_\_



(7 marks)

6. The shape ABCD consists of a **right-angled triangle, ABD**, with a **semicircle, BCD**, added on at one end.



(a) Find the **length of AB**, giving your answer correct to **3 significant figures**.

Answer: **AB =** \_\_\_\_\_ **m**

(b) Find the **total perimeter** of the above shape ABCD. Give your answer correct to the **nearest metre**.

Answer: **Total Perimeter =** \_\_\_\_\_ **m**

(6 marks)

7. Given that  $x = 5y - 4$ :

(a) Make  $y$  the subject of the equation.

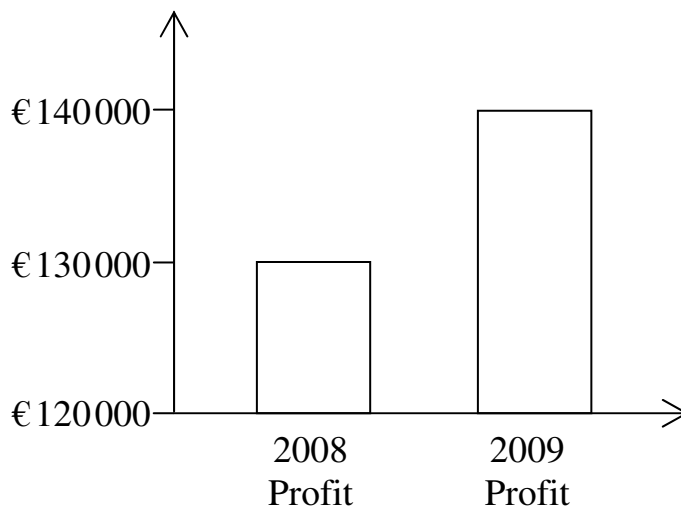
Answer:  $y =$  \_\_\_\_\_

(b) Find  $y$  when  $x = 16$ .

Answer:  $y =$  \_\_\_\_\_

(4 marks)

8. (a) The graph compares a company's profit for the year 2008 with that for 2009.



Martha looks at the graph and says:

“The company is doing really well – profits have doubled”.

Is she correct? **Explain your reasoning.**

Answer: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

8. (b) The pie chart represents **270** cars in a car park. They are grouped by make as shown on the pie chart.

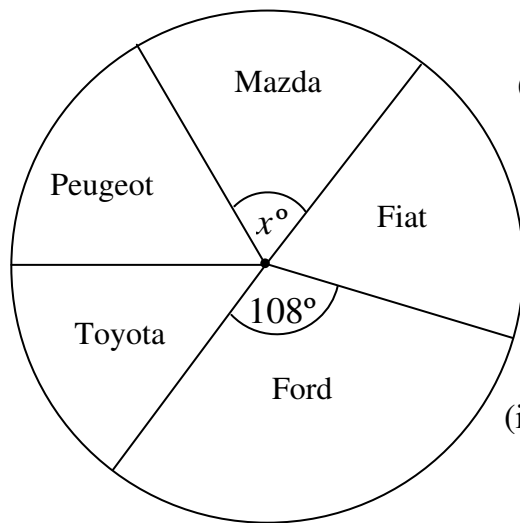


DIAGRAM NOT TO SCALE

(i) How many **Ford** cars were there in the car park?

Answer: \_\_\_\_\_

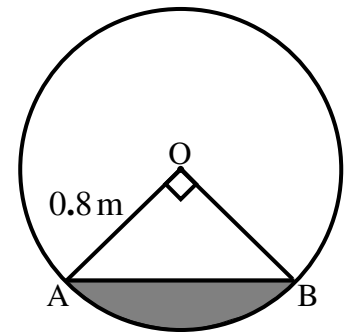
(ii) There were **51 Mazda** cars in the car park. Work out the size of angle  $x$ .

Answer: \_\_\_\_\_

(5 marks)

9. The figure shows a large circular sign. The radius of the circle is 0.8 m.  $\angle AOB$  is a right angle.

Work out the following, giving your answers correct to **2 decimal places**, where necessary:



(a) The **area** of triangle OAB.

Answer: \_\_\_\_\_  $m^2$

(b) The **area** of the sector OAB.

Answer: \_\_\_\_\_  $m^2$

(c) The **shaded area**.

Answer: \_\_\_\_\_  $m^2$

(6 marks)

10. (a) Find the value of  $x$ :

(i)  $5^x = 1$

Answer:  $x =$  \_\_\_\_\_

(ii)  $2^x = \frac{1}{4}$

Answer:  $x =$  \_\_\_\_\_

(b) Solve the equation  $4(y - 3) = 6y + 2$

Answer:  $y =$  \_\_\_\_\_

(c) A tank can be emptied using six pumps in a period of 18 hours.  
How long will it take to empty the tank using eight pumps?

Answer: \_\_\_\_\_ hours

(6 marks)

11. (a) What is the **y-intercept** of line L?

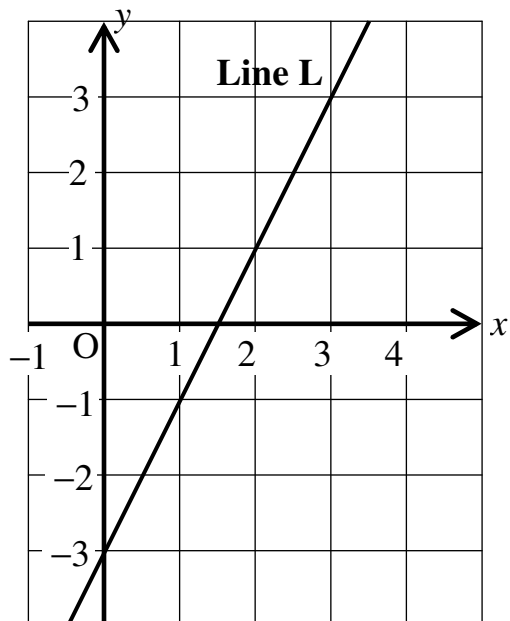
Answer: \_\_\_\_\_

(b) Work out the **gradient** of line L?

Answer: \_\_\_\_\_

(c) Write down the **equation** of the line.

Answer: \_\_\_\_\_

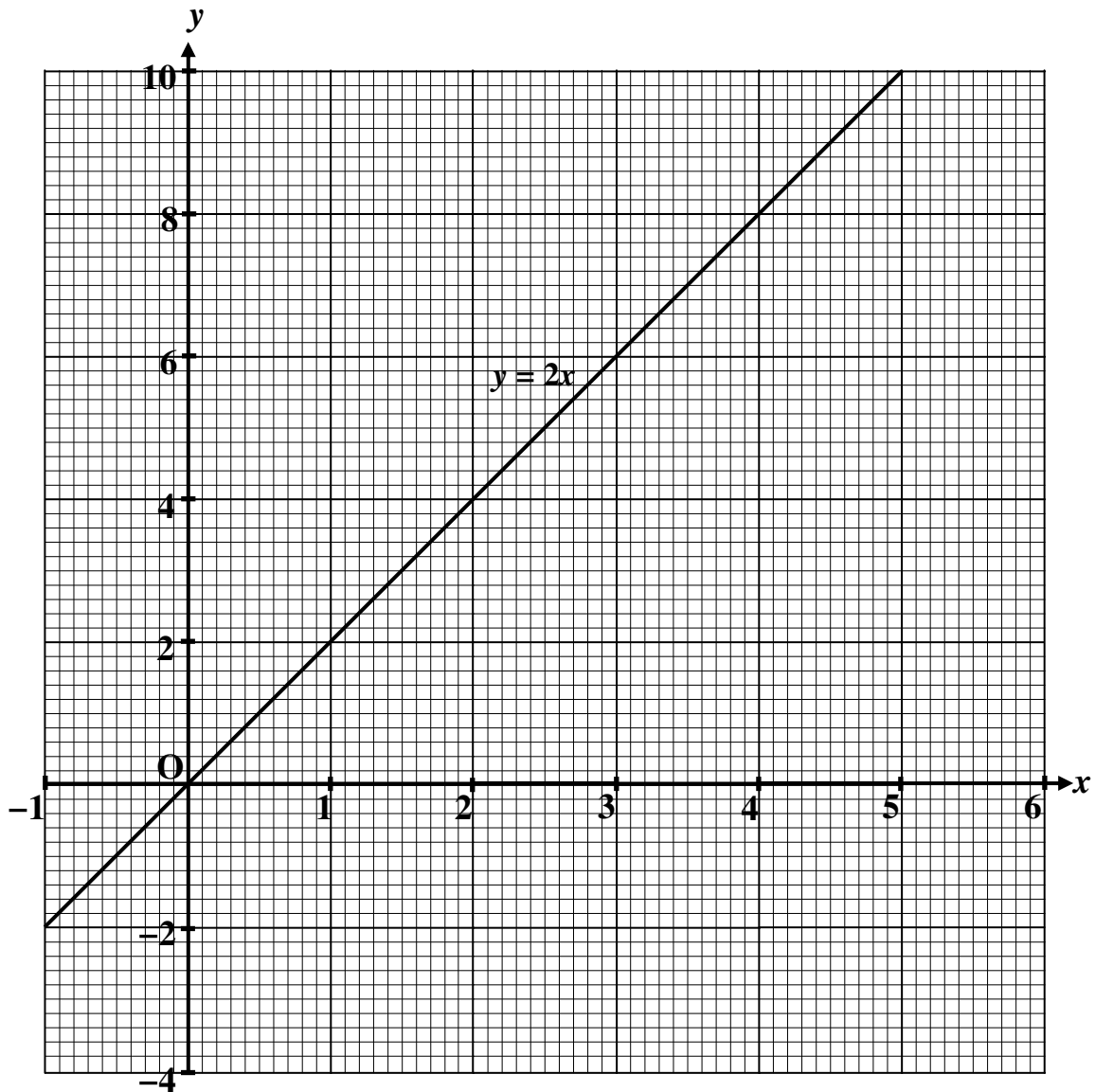


(d) Write down an equation of a line which is **parallel** to line L and passes through the point **(0, -1)**.

Answer: \_\_\_\_\_

(6 marks)

12. The line with equation  $y = 2x$  is drawn on the grid.



(a) Complete the table for the graph of  $y = 8 - 2x$ .

|       |    |    |   |
|-------|----|----|---|
| $x$   | -1 | 1  | 4 |
| 8     |    |    |   |
| $-2x$ |    | -2 |   |
| $y$   |    |    | 0 |

(b) On the grid above, draw the graph of  $y = 8 - 2x$ .

(c) Using the graphs solve the pair of simultaneous equations  $y = 2x$   
 $y = 8 - 2x$

**Answer:**  $x = \underline{\hspace{2cm}}$ ,  $y = \underline{\hspace{2cm}}$

(7 marks)

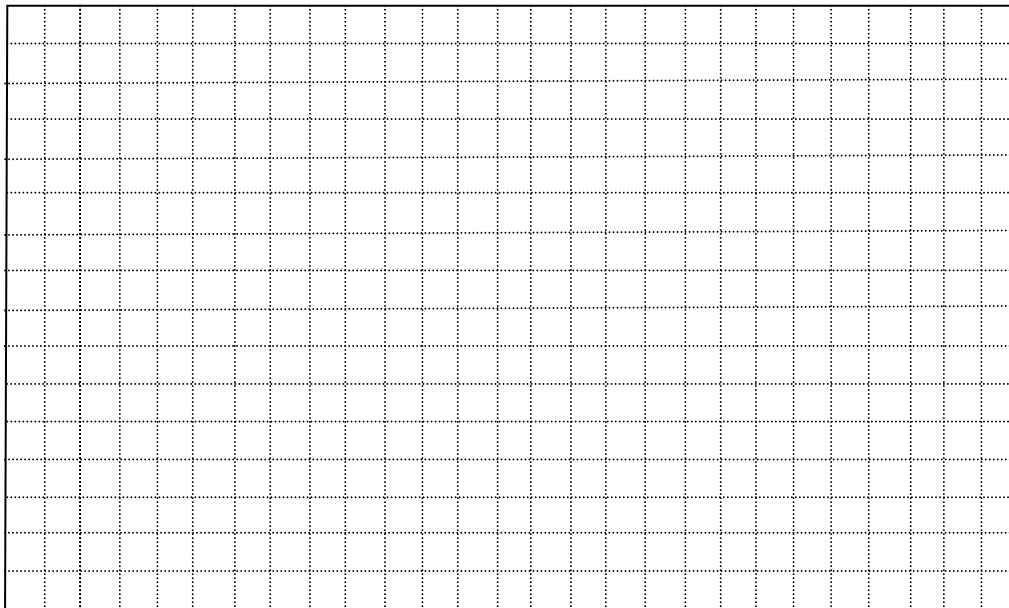
13. The heights,  $h$ , in cm, of a set of 20 seedlings were measured. The results are given below.

|            |            |            |            |
|------------|------------|------------|------------|
| <b>6.7</b> | <b>4.0</b> | <b>4.9</b> | <b>3.0</b> |
| <b>6.1</b> | <b>6.5</b> | <b>4.7</b> | <b>4.1</b> |
| <b>5.3</b> | <b>3.4</b> | <b>3.8</b> | <b>5.0</b> |
| <b>4.3</b> | <b>7.6</b> | <b>4.2</b> | <b>6.9</b> |
| <b>4.5</b> | <b>6.8</b> | <b>3.6</b> | <b>5.7</b> |

(a) Complete the following grouped frequency table to show the above data.

|                    |                |                |                |                |                |
|--------------------|----------------|----------------|----------------|----------------|----------------|
| Height, $h$ , (cm) | $3 \leq h < 4$ | $4 \leq h < 5$ | $5 \leq h < 6$ | $6 \leq h < 7$ | $7 \leq h < 8$ |
| Frequency          |                |                |                |                |                |

(b) Draw a **histogram** to illustrate this data. Label your diagram.



(c) What is the **modal group** for the height of the seedlings?

**Answer: Modal group = \_\_\_\_\_**

(7 marks)

**END OF PAPER**