

FORM 3

MATHEMATICS
(Non Calculator Paper)

TIME: 30 minutes

Name: _____

Class: _____

1	2	3	4	5	6	7	8	9	Total

INSTRUCTIONS TO CANDIDATES

- **Answer ALL questions.**
 - **This paper carries a total of 25 marks.**
 - **Calculators and protractors are NOT ALLOWED.**
-

1. a) Write 32% as a fraction in its simplest form.

Ans: _____

b) Work out $\frac{2}{5} \times 1\frac{3}{7}$

Ans: _____

c) Factorise completely: $27a^2 + 18a$

Ans: _____

_____ (3 marks)

2. In a mixed school, the ratio of male to female students is 5 : 8.
There are 80 male students. How many **female** students are there?

Ans: _____

_____ (2 marks)

3. During the last season a waterpolo team scored the following goals in its matches.

9 6 7 11 8 13 9 9 10

Find:

a) **the mode**

Ans: a) _____

b) **the median**

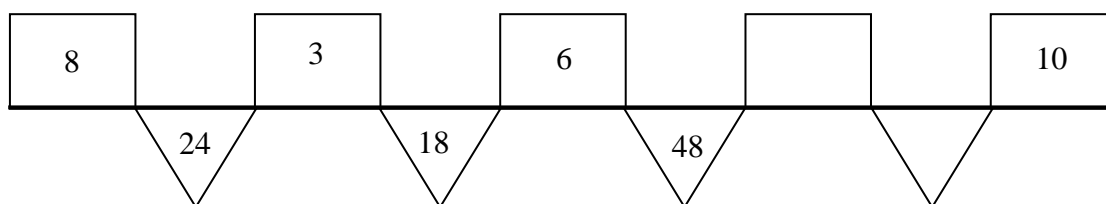
Ans: b) _____

c) **the range**

Ans: c) _____

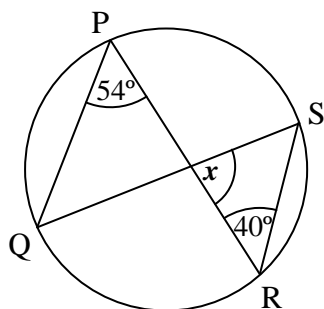
_____ (3 marks)

4. Fill in the missing numbers.



_____ (2 marks)

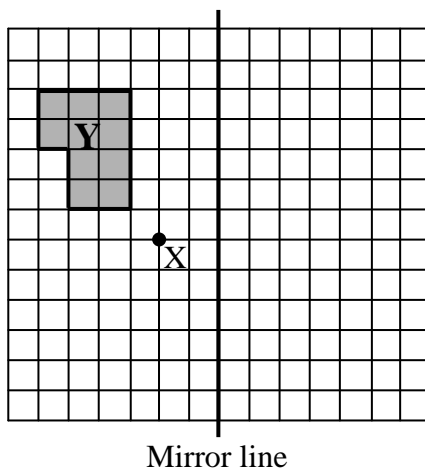
5. Calculate angle x .



Ans: $x =$ _____[°]

(3 marks)

6. a) Draw the **reflection** of shape **Y** in the mirror line. Label it A.

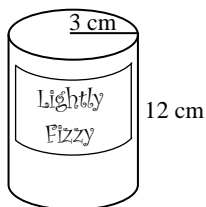


Mirror line

b) **Rotate** shape **Y** 180° clockwise about X. Label it B.

(2 marks)

7. a) A soft drink is sold in cylindrical cans of radius 3 cm and height 12 cm.
Taking $\pi = 3$, find the **volume** of the can.



Ans: _____

b) In a promotion, the company is offering “10% extra free” in a new can.
What is the volume of the new can?

Ans: _____

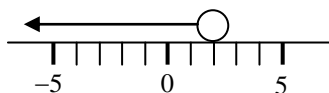
(4 marks)

8. a) Write True or False.

i) $2 < 1$ Ans: _____

ii) $\frac{1}{3} > 0.3$ Ans: _____

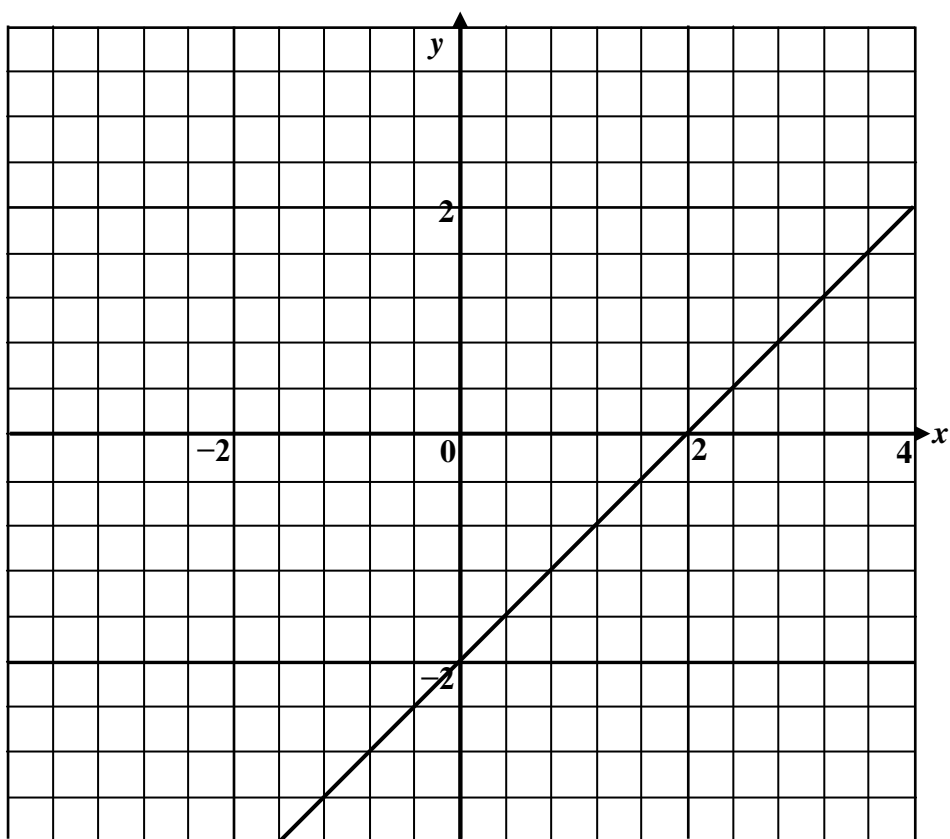
b) Write the inequality for x , represented by the following number line.



Ans: _____

_____ (3 marks)

9. Work out the **equation** of the line below.



Ans: $y =$ _____

_____ (3 marks)

END OF PAPER



FORM 3

MATHEMATICS (Main Paper)

TIME: 1h 30min

Name: _____

Class: _____

1	2	3	4	5	6	7	8	9	10	11	12	13	Total Main	Non Calculator	GLOBAL MARK

**CALCULATORS ARE ALLOWED BUT ALL NECESSARY WORKING MUST BE SHOWN.
 ANSWER ALL QUESTIONS.**

1. a) Simplify $\left(\frac{7^2 \times 7^4}{7^8}\right)^2$. Give your answer in **index** form.

Ans: _____

b) Calculate, giving your answer in **standard form**.

$$\frac{2.76 \times 10^3}{6.9 \times 10^{-2}}$$

Ans: _____

(4 marks)

2. a) Expand and simplify: $5(x + y) + 2(x + z)$

Ans: _____

b) Solve: $3p - 2 = 4 - 2(p - 2)$

Ans: _____

(4 marks)

3. a) A model ship is drawn to scale of 1 : 2000. The model is 50 cm long.

Work out the **actual** length in **metres** of the ship.

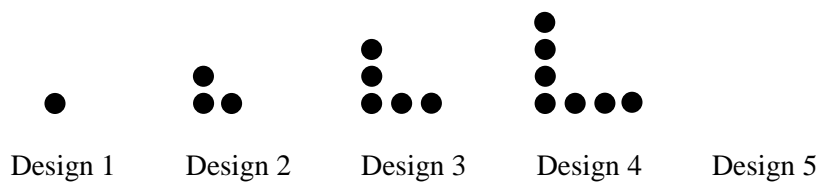
Ans: _____

b) In January 2010, Sandra deposited money in a bank account at 3% simple interest. A year later she received €150 interest. What sum of money did Sandra deposit?

Ans: _____

_____ (6 marks)

4. These designs are made by arranging counters in L-shapes.



a) Draw **Design 5**.

b) Complete this table.

Design	1	2	3	4	5
No. of counters	1				

c) How many counters are there in **Design 6**?

Ans: _____

d) Write a formula for the n th term and find how many counters are needed to make **Design 20**.

Ans: _____

_____ (6 marks)

Name _____

Class _____

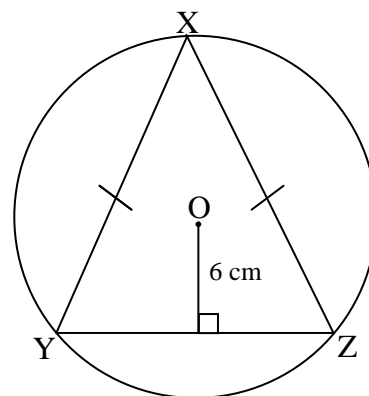
A

5. XYZ is an isosceles triangle inscribed in a circle centre O of radius 10 cm. The perpendicular distance from O to YZ is 6 cm.

Calculate:

a) the **length** of YZ

b) the **area** of $\triangle XYZ$



Ans: a) _____

Ans: b) _____

(4 marks)

6. a) Make ***p*** the subject of the formula: $q = 5p - 8$

Ans: _____

b) Expand and simplify: $(n + 1)(n - 1)$.

Ans: _____

c) Simplify $\frac{2x(x - y)}{4x^2}$, giving your answer in its simplest form.

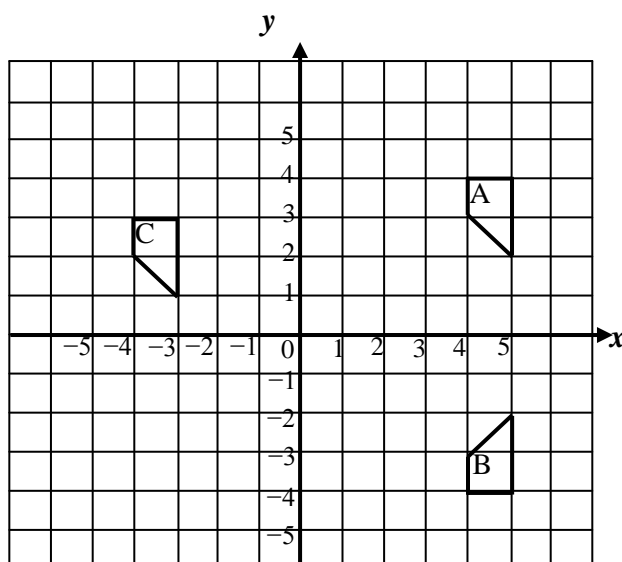
Ans: _____

- d) The equation $x^2 + 3x = 20$ has a solution between $x = 3$ and $x = 4$. Use trial and improvement to find the value of ***x*** correct to 1 decimal place. Show your working.

Ans: _____

(8 marks)

7.



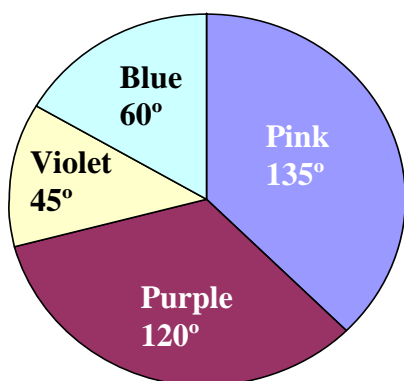
a) What transformation will map shape A on to shape B?

b) What transformation will map shape A on to shape C?

(4 marks)

8. a) The pie chart shows the proportions of the different colours on a circular disc of radius 20 cm.

i) Work out the **area** shaded in blue, giving your answer to 1 decimal place.



ii) A coin is tossed on the disc. What is the **probability** that the coin falls on the pink sector?
Write your answer as a fraction simplified to its lowest term.

Ans: _____

b) Brenda rolls a fair dice 45 times, with the following results.

Score	Frequency
1	8
2	11
3	4
4	8
5	5
6	9

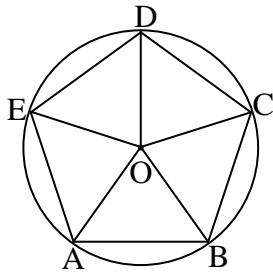
i) What is the **mean** score?

ii) From the above table determine the probability of getting the number 6.

Ans: _____

(8 marks)

9. A regular pentagon is inscribed in a circle centre O.



a) Work out the value of $\angle AOB$.

Ans: _____

b) What type of triangle is AOB?

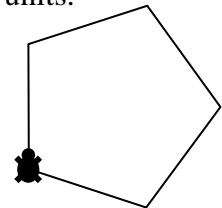
Ans: _____

c) Calculate $\angle ABC$.

Ans: _____

d) Fill in the logo program that draws the regular pentagon shown of side 40 units.

PD
REPEAT ____ [FD ____ RT ____]



(8 marks)

10. PQ is a diameter of the circle centre O. R is a point on the circumference of the circle and S is a point on PR produced and $\angle ROQ = 120^\circ$.

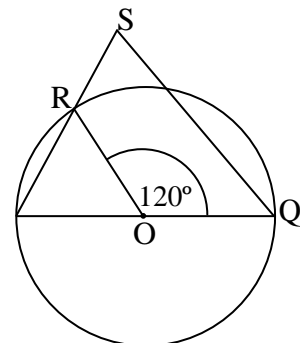
Giving reasons, calculate the following:

a) $\angle RPO =$ _____

Reason _____

b) $\angle SRO =$ _____

Reason _____

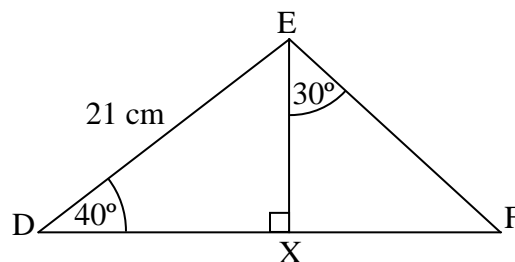


(4 marks)

11. DEF is a triangle in which DE is 21 cm long. EX is perpendicular to DF.

Calculate:

a) the **length** of EX, correct to 1 decimal place.



b) the **length** of DF correct to 3 significant figures.

Ans: a) _____

Ans: b) _____

(6 marks)

12. a) Complete the table for values of $y = x^2 + 2x - 4$.

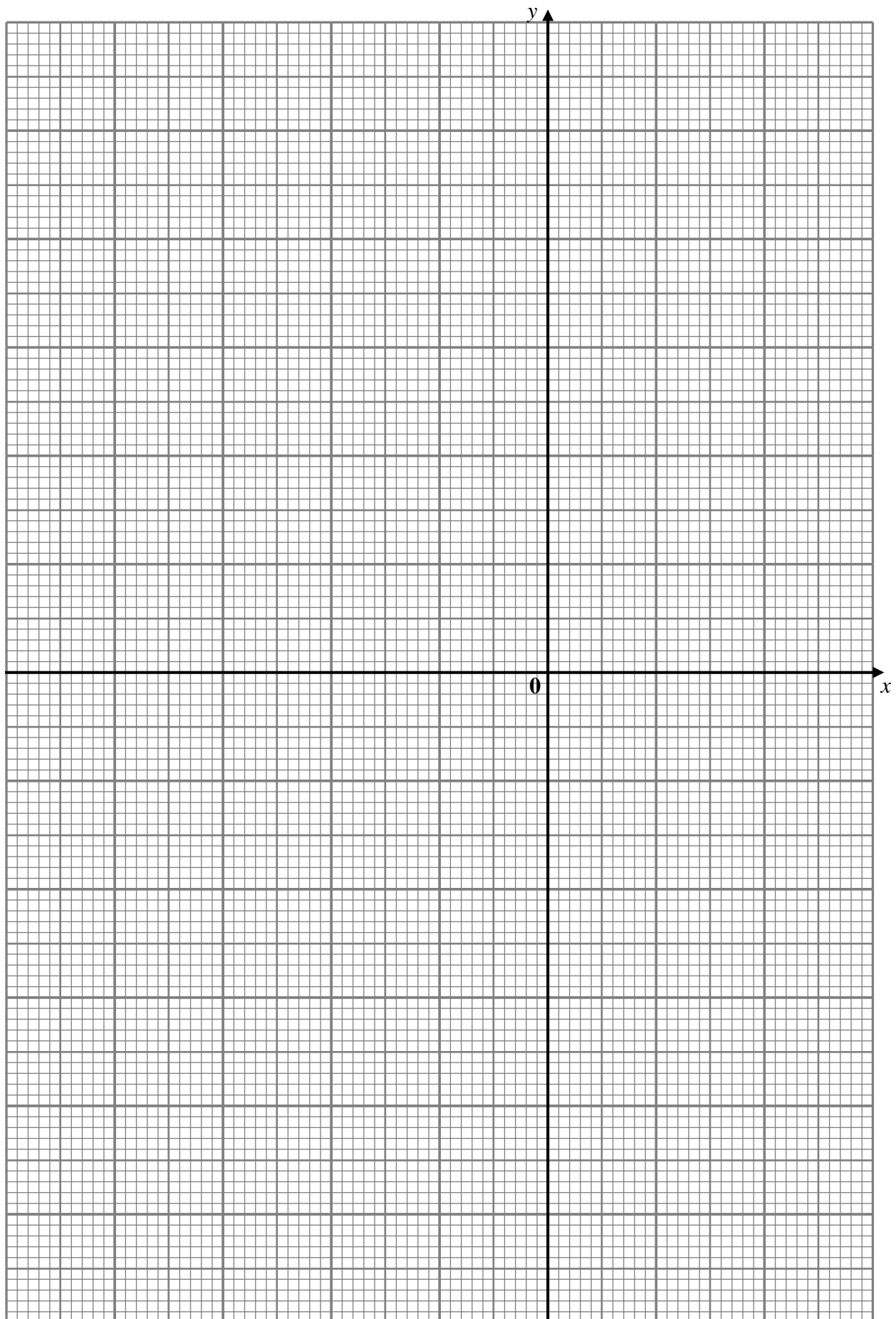
x	-4	-3	-2	-1	0	1	2
x^2	16		4		0		
$2x$	-8		-4		0		
-4	-4		-4		-4		
y	4		-4		-4		

b) Use a scale of 2 cm = 1 unit on both axes to draw the graph $y = x^2 + 2x - 4$.

c) Write the minimum value of y . $y = \underline{\hspace{2cm}}$

d) Use your graph to solve $x^2 + 2x - 4 = 0$. $x = \underline{\hspace{2cm}}, \underline{\hspace{2cm}}$

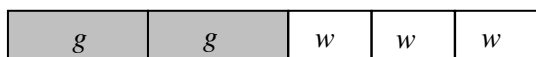
(7 marks)



13. David has some grey rods and some white rods.

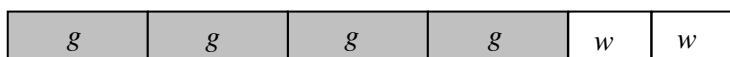
g stands for the length of a grey rod
 w stands for the length of a white rod

a) The total length of 2 grey rods and 3 white rods is 33 cm. Write an **equation** for this diagram.



Ans: _____

b) The total length of 4 grey rods and 2 white rods is 46 cm. Write an **equation** for this diagram.



Ans: _____

c) **Solve** your equations simultaneously to find the values of g and w .

Ans: $g =$ _____

$w =$ _____

(6 marks)

End of Paper