

FORM 3MATHEMATICS SCHEME A
Non Calculator PaperTIME: 30 minutes

Name: _____

Class: _____

Instructions to Candidates

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

1. What is the **volume** of water this cylinder can hold when full? Give your answer in terms of π .



(2 marks)

2. Continue the following procedure to draw a regular **octagon**, each side of length **fifty** turtle steps.



3. What is the **bearing** of X from Y?



Ans _____ (2 montes)





Ans _____

(2 marks)

- 5. To be admitted into Baker University, students must be 17 years or older but younger than 25 years.
 - a) Fill in the boxes with the missing symbols:



6. A greengrocer bought a box of apples at a price of €1 per kg. He sold 4 kg at €2 per kg and the remaining 6 kg at €1.50 per kg. What is the percentage profit?

Ans _____ (3 marks)

7. Gabriel invests €5000 for 5 years and gets an interest of €500. What is the **rate** of interest?

Ans _____ (2 marks)

8. Work out $3^2 \times 2^{-2}$, giving your answer as a fraction.

Ans _____ (2 marks)

9. Brown colour is made up by mixing three other colours: **red**, **blue** and **yellow** with volumes in the ratio **3** : **2** : **1.5**.

a) Simplify the above ratio.

Ans _____

b) Priscilla buys 39 ml of brown colour. How much yellow colour does it contain?

Ans _____ (3 marks)

10. In his fridge, Ted has 2 full cartons of milk and another carton which is half empty. In Emma's fridge there is 1 full carton of milk, another one which is $\frac{1}{4}$ empty and another carton which is $\frac{1}{3}$ empty. What is the total amount of cartons with milk that Ted and Emma have altogether?

Ans _____

(4 marks)



Main Paper								112, 111	Somm								
Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total Main	Non Calc	Global Mark
Mark																	

MATHEMATICS SCHEME A

DO NOT WRITE ABOVE THIS LINE

Name: ______

FORM 3

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

a) The distance between planet Earth and the sun is 149,597,870.7 km.
 i) Write this number correct to 2 significant figures.

ii) Write this number in standard form, correct to 2 significant figures.

Ans _____

Ans _____

Ans _____

b) The distance between planet Jupiter and the sun is 780 million kilometres. How many times is this distance larger than the distance between Earth and the sun? Give a sensible approximation.

		(4 marks)
 On the right pan of a scale, Catherine puts a 1 kg weight. On the left pan, Will puts three weights: a heavy one and two lighter identical ones. 		
Suggest 2 possible sets of values for the weights on the left pan for the scale to be balanced.	????	1 kg

Ans: $\underline{g}, \underline{g}, \underline{g}$. (2 marks)

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TIME · 1h 30min

Class:

3. Simplify:
$$\frac{4x + 12y}{x^2 + 3xy}$$

	Ans _	
		(3 marks)
 a) Use this diagram to prove that the is equal to 90°. 	angle in a semicircle	A O B
 b) O is the centre of this circle and Re∠PRO = 57° and ∠SOR = 62°. Coreasons, the value of: i) ∠PQO 	OQ is a diameter. Calclulate, by giving	P 0 57° 62°
Ans		
Reason		K <u>S</u>
ii) ∠OSQ		
Ang Damag		
		(5 marks)
5. a) i) Expand $2a(a+7)$	ii) Expand ar	nd simplify $(x+3)(x-2)$
Ans i)	Ans ii)	
b) Simplify: $3ab^2 \times 4a^2b^3$		
Ans		

Name:	Class:

c) Rearrange 3b + fb = 7 to make f the subject of the formula.

Ans _____ (6 marks)

6. Two large rods, A and B, are made up of smaller rods as shown in the diagram below. The letter *x* represents an unknown length of some of the smaller rods. Rods A and B are of **equal length**. All measurements are in metres and the diagram is not to scale.

Rod A	x	x	7		x	x	x	
					_			1
Rod B	x	6		x	x		6	x

a) What is the total length of rod A? Simplify your answer.

Ans _____

- b) What is the total length of rod B? Simplify your answer.
- c) Form an equation in x and solve it.

Ans _____

Ans _____

7. From a point C on a ship, the captain notices a man at point M. Z is a point vertically below C and horizontally to the left of M. CZ is 5 m long and the angle of elevation of C from M is 20°.



a) What is the value of $\angle MCZ$?

Ans _____

b) Use a scale of **1 cm : 1 m** to draw triangle CZM accurately. Point Z has already been drawn for you.

• Z

c) Make the necessary measurement on your diagram to calculate, in metres, the **actual** distance ZM. Give your answer correct to 1 decimal place.

Ans _____

(4 marks)

On a spreadsheet, Abigail constructs a sequence. In cell B2 she types =B1*3+5, in cell C2 she types =C1*3+5, in cell D2 she types =D1*3+5 and so on for all the cells in row 2. Columns E to Y are not shown in this diagram.

	Α	В	С	D	Z
1	Value of <i>n</i>	1	2	3	25
2	Sequence				

a) What is the **number** obtained in cell B2?

	Ans	
b) What is the formula that should b	be typed in cell Z2?	
	Ans	
c) What is the nth term of the seque	ence formed in row 2?	
	Ans	
d) Which cell, in row 2, contains the	e value 35 ?	
	Ans	
		(4 marks)

- 9. Kane buys 8 bottles of water and 6 salads for the price of €26.40. Ritianne buys 6 bottles of water and 3 salads for the price of €15.
 - a) Use $\in w$ to represent the price of a bottle of water and $\in s$ to represent the price of a salad and write down two equations from the above information.

Ans ______, _____,

b) Use the equations you wrote in part (a) to find the cost of a salad.

Ans s =_____.

(5 marks)

10. During a fund raising activity, the people's donations were summarised in the table below:

a) How many people made a donation in this activity?	Donation (€)	Frequency
A no	2	8
Alls	5	20
b) What is the range of donations?	10	54
	20	16
Ans		

c) Work out the **median** donation.

Ans _____

- d) The diagram below is to be used to draw a bar graph representing the information given in the table.
 - i) Label the vertical axis of the bar graph.
 - ii) Shade the correct number of rectangles to represent the information given in the table.



e) A donor is picked at random. What is the probability, in its simplest form, that this donor has donated €10 or less?

Ans _____

(10 marks)

- 11. The monthly fee charged by a telephone company is: €5 as a fixed charge plus €0.40 per call. In January, Joseph makes 30 calls, Charlene makes 40 calls and Tim makes 80 calls.
 - a) In each column of this table, the company works out the final bill for each person. Complete the table.

Number of calls Fee charge	Joseph 30 calls	Charlene 40 calls	Tim 80 calls
Fixed charge of €5	5	5	
Charge of €0.40 per call		16	
Final bill (€)		21	37

- b) Use the table in part (a) to continue plotting this graph of **Final bill** against **Number of calls**.
- c) Find the **gradient** of the plotted line.

Final bill (€) 40

d) Write down the intercept, on the y-axis, of the plotted line.

Ans _____

Ans _____

20

40

e) If the 'Number of calls' is represented by *x* and the 'Final bill' is represented by *y*, form an **equation** in *x* and *y* to represent the plotted line.

0

Ans _____

f) Tim has made twice as many calls as Charlene. However, his final bill is not twice that of Charlene. Give an explanation.

Ans _____ (8 marks)

80

Number of calls

60

12. Cody stands on the horizontal rooftop RB which is 1.5 m long. He wants to get onto another horizontal rooftop PQ where Q is 4 m vertically above R. He puts a ladder AB, 5 m long, in a position as shown in the diagram. In the following questions, give all your answers correct to **1 decimal place**.

a) Calculate the length **QB**.



Ans _____

b) Work out the size of $\angle BQR$.

c) What is the value of AQ?

Ans _____

Ans _____

d) On the ladder there is a note saying, "For safety reasons, this ladder must be between 80° and 85° to the horizontal." According to this note, is it safe for Cody to use the ladder as shown in the diagram? Explain why.

Ans ______ (7 marks)

centre is 60°. What is the area of sector A? Give your

answer to the nearest m^2 .



14. a) A is a sector of a circle of radius 3 m. The angle at the

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- 13. a) Draw the **reflection** of shape A in the *x*-axis. Label it B.
 - b) Rotate shape A 180° about (0, 0) and label it C.
 - c) Draw the enlargement of shape A using (2, 7) as the centre and scale factor 2. Label it D.
 - d) Describe the transformation that maps shape D to shape X.
 - e) Describe the transformation that maps shape Y to shape X.



(7 marks)



Ans _____

b) Kylie cuts three pieces of black paper exactly like the shape of sector A. She also cuts three **identical** pieces of black paper in the shape of another sector B, of radius 2 m. To construct the design on the right, Kylie places all the pieces on a white circular paper of radius 3 m.

What is the **total area** of the **white** parts of the design? Give your answer correct to the nearest m^2 .

Ans _____ (6 marks)