



FORM 4

MATHEMATICS  
Main Paper

TIME: 1 hr 40 mins

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	Main	NC	Global Mark
Mark																

**DO NOT WRITE ABOVE THIS LINE**

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

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

**INSTRUCTIONS TO CANDIDATES:**

- Answer all questions.
- This paper carries 80 marks.
- Calculators and mathematical instruments are allowed but all necessary working must be shown.

1. a) Express 154 and 165 as a product of their prime factors.

Ans: 154 = \_\_\_\_\_, 165 = \_\_\_\_\_

b) Hence or otherwise find (i) the LCM and (ii) the HCF of 154 and 165.

Ans: LCM = \_\_\_\_\_ Ans: HCF = \_\_\_\_\_

(5 marks)

2. The table below shows the number of English speaking persons in a number of countries.

Country	Number of English speakers
Australia	$1.52 \times 10^7$
Canada	$1.77 \times 10^7$
Jamaica	$2.4 \times 10^6$
New Zealand	$3.2 \times 10^6$
USA	$2.25 \times 10^8$
UK	$5.68 \times 10^7$
Guyana	$4.8 \times 10^5$

- a) Which of these countries has the largest number of English speakers? \_\_\_\_\_
- b) Which country has an English speaking population of almost half a million?  
\_\_\_\_\_
- c) What is the difference in the number of English speakers between USA and UK?  
(Give your answer in standard form).  
\_\_\_\_\_
- d) List the countries in order, starting with the country having the **least** number of English speakers.

\_\_\_\_\_

(6 marks)

3. The population of a town grows by 13% in one year and by 16% in the next year. What is the overall percentage increase?

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

(3 marks)

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

Track 3

4. Convert:

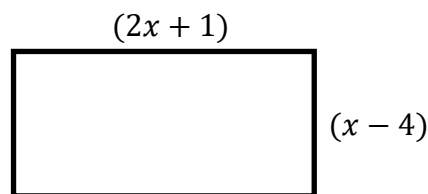
a)  $2500 \text{ cm} = \text{_____ km.}$

b)  $536 \text{ cm}^2 = \text{_____ m}^2$

c)  $35 \text{ m}^3 = \text{_____ cm}^3$

(3 marks)

5. a)



i) Write down an expression for the area of the rectangle.

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

ii) Given that  $x = 10 \text{ cm}$ , find the area of the rectangle.

Ans: \_\_\_\_\_  $\text{cm}^2$

b) Factorise fully i)  $3x^2 - 6x$

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

ii)  $9x^2 - 16y^2$

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

iii)  $3p^2 + 12p - 36$

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

(9 marks)

6. The price of a house increases by 15% each year. The value of a house in 2015 was €150,000.

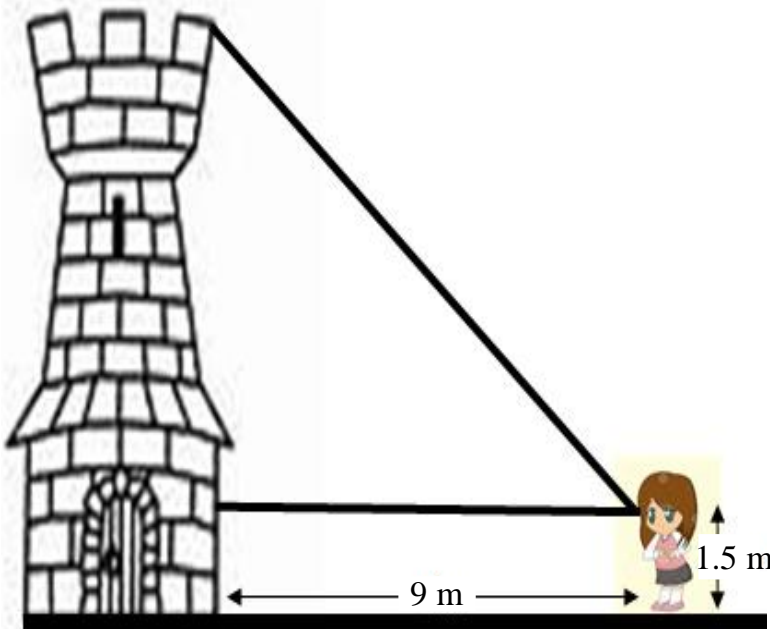
a) What was the value of the house in 2014 correct to the nearest €1000?

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

b) What will the value of the house be in 2016?  
(Do NOT round your answer).

Ans: \_\_\_\_\_  
(6 marks)

7. Mariah is standing 9 m away from a tower. She is 1.5 m tall and the angle of elevation of the top of the tower from Mariah's eyes is  $38^\circ$ .



a) Mark the angle of elevation on the diagram.

b) Find the height of the tower correct to 3 significant figures.

Ans: \_\_\_\_\_ m

c) Mariah gets closer to the tower. What happens to the angle of elevation?

(5 marks)

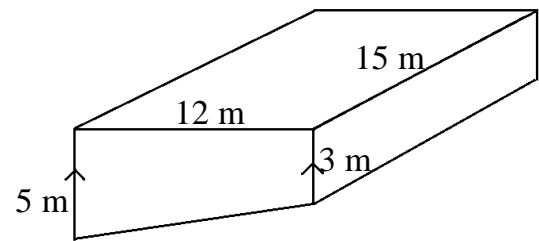
Name : \_\_\_\_\_

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

Track 3

8. A pool has the cross-section of a trapezium.

a) Find the area of cross-section.



Ans: \_\_\_\_\_ m<sup>2</sup>

b) The length of the pool is 15 m. Work out the volume of the pool.

Ans: \_\_\_\_\_ m<sup>3</sup>

c) How many litres of water are needed to fill the pool?

Ans: \_\_\_\_\_ litres

(6 marks)

9. Make  $x$  the subject of the formula:

a)  $x(a - b) = 3$

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

b)  $x^2y = a$

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

c)  $\sqrt{bx} = c$

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

d)  $ax + t = rt + bx$

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

(8 marks)

10. Mr Millionaire inherited €720,000,000. He is going to invest:

- ★ **half** of the sum of money at 5% p.a. simple interest for five years
- ★ the **remaining half** of the sum of money at 2% p.a. compound interest for 5 years

Find the total interest gained after 5 years.

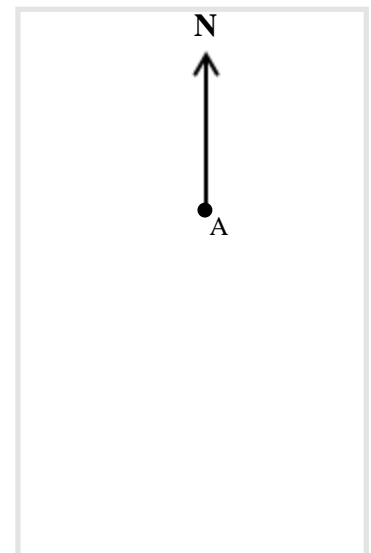
Ans: \_\_\_\_\_

(6 marks)

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11. Mark starts from point A. He walks a distance of 5 km West and then 13 km South to point B.

- a) Continue the rough sketch to show Mark's journey.
- b) Mark walks back from B to A. Calculate the distance AB correct to 1d.p.



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

- c) Find the bearing of B from A. Give your answer to the nearest degree.

Ans: \_\_\_\_\_ °

(8 marks)

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12. The formula for the area of a trapezium can be written as  $A = \frac{(a + b)h}{2}$

a) Make  $a$  the subject of the formula.

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

b) Find the value of  $a$  given that the area is  $25 \text{ cm}^2$ , the height is  $5 \text{ cm}$  and the length  $b$  is  $3 \text{ cm}$ .

Ans: \_\_\_\_\_ cm

(6 marks)

13. a) Complete the table for  $y = 2x + 5$  for the values of  $x$  from  $-3$  to  $3$ .

$x$	$-3$	$-2$	$-1$	$0$	$1$	$2$	$3$
$2x$							
$+5$							
$y$							

b) Plot the graph of  $y = 2x + 5$  using a suitable scale.

c) Use the graph to find:

i) the value of  $x$  when  $y = 6$  \_\_\_\_\_ Ans

ii) the value of  $y$  when  $x = 0.2$  \_\_\_\_\_ Ans

d) Which one of the following lines is parallel to the graph with equation  $y = 2x + 5$  ?

A)  $2x + 2y = \frac{1}{2}$

B)  $y + 2x = 8$

C)  $y - 2x = 7$

(9 marks)

