



St. Nicholas College

Boys Secondary Naxxar
Half-Yearly Examinations

February 2014

BS
Naxxar

FORM 3

MATHEMATICS TRACK 3
Main Paper

TIME: 1 h 30 mins

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total main	Non- calculator	Global mark
Mark																	

DO NOT WRITE ABOVE THIS LINE

Name: _____

Class: _____

- Answer all questions.
- This paper carries 75 marks.
- Calculators and mathematical instruments are allowed but ALL necessary working must be shown.

1. Simplify :

(a) $4t^2 + 2t^2 - 3t^2$

Ans: _____

(b) $4p^2 \times p \times 3p^3$

Ans: _____

(c) $(2a^3)^2$

Ans: _____

(3 marks)

2. Work out, giving your answer as a **fraction**:

(a) $2^0 \times 2^{-3}$

Ans: _____

(b) $4^2 \times 4^3 \div 4^6$

Ans: _____

(2 marks)

3. (a) Factorise completely: $8ax^2 + 16a^3x$.

Ans: _____

(b) Expand and simplify:

(i) $(x - 5)^2$

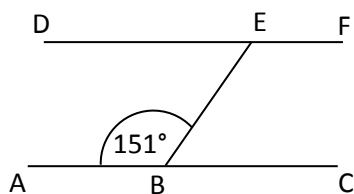
Ans: _____

(ii) $5(3w + 5) - 2(5w - 4)$

Ans: _____

(5 marks)

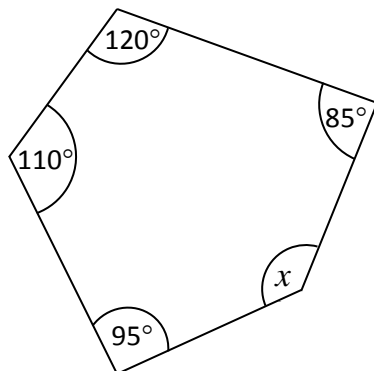
4. (a) In the diagram, ABC and DEF are **parallel lines** and $\angle ABE = 151^\circ$.
Find the size of angle DEB.



NOT TO SCALE

Ans: _____

(b) Work out the value of x in the polygon below.



Ans: $x =$ _____

(6 marks)

Name: _____

Class: _____

5. Paul makes a cake by mixing flour, sugar and nuts in the ratio of 6 : 3 : 1.

(a) How much flour does he use to make a cake mix of 1800 g?

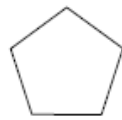
Ans: _____ g

(b) If he only has 60 g of nuts, how much sugar would he need?

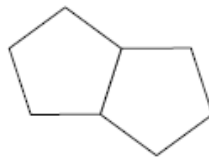
Ans: _____ g

(4 marks)

6. The first three patterns of a sequence made up of sticks are shown below.



Pattern 1



Pattern 2



Pattern 3

(a) Complete the table which shows the **number of sticks** in each pattern.

Pattern number	1	2	3	4	5
Number of sticks	5	9	13		

(b) Find the n^{th} term of this pattern.

Ans: _____

(c) How many sides are there in the **10th** pattern?

Ans: _____ sides

(d) Which pattern number has 81 sides?

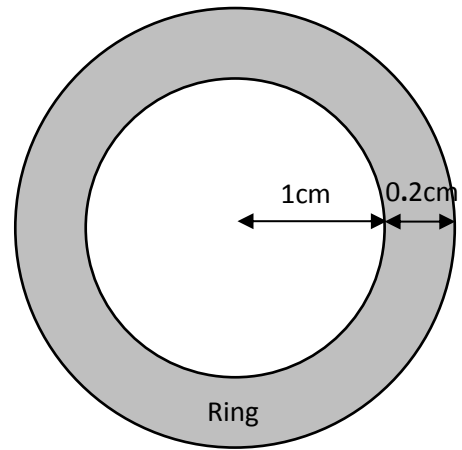
Ans: Pattern _____

(6 marks)

7. The diagram shows a cross-section of a ring, made up of an inner circle of radius 1 cm and an outer circle of radius 1.2 cm.

Work out, giving your answer correct to **1 decimal place**:

- (a) the circumference of the inner circle.



Ans: _____ cm

- (b) the area of the inner circle.

Ans: _____ cm²

- (c) the area of the ring. **(the shaded part)**

Ans: _____ cm²

(7 marks)

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8. (a) Solve the equation $2(x - 5) = 6x - 2$.

Ans: $x =$ _____

(b) (i) Make p the subject of the equation $m = \frac{4p+6}{x}$.

Ans: _____

(ii) Find the value of p when $m = 11$ and $x = 2$.

Ans: _____

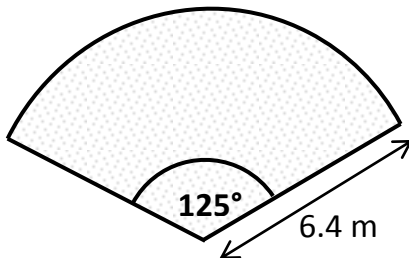
(c) The equation $x^2 + x = 24$ has a solution between $x = 4$ and $x = 5$.

Use trial and improvement method to find the value of x correct to **1 decimal place**.

Ans: $x =$ _____

(8 marks)

9. A flowerbed in a park is in the shape of a sector of a circle.



(a) Calculate the total perimeter of the flowerbed, giving your answer to 3 significant figures.

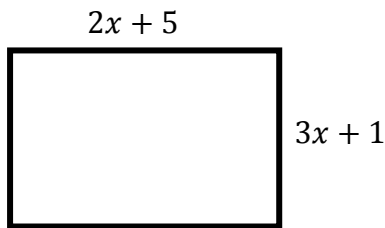
Ans: _____ m

(b) Calculate the area of the flowerbed, giving your answer to the nearest m^2 .

Ans: _____ m^2

(5 marks)

10. The diagram below shows a rectangle. The **width** of this rectangle is $(3x + 1)$ cm.
Its **length** is $(2x + 5)$ cm



- (a) Write down an expression in terms of x for the perimeter of the rectangle.

Ans: _____

- (b) The perimeter is 42 cm.

- (i) Write down an equation in x and solve it.

Ans: $x =$ _____

- (ii) What are the length and width of the rectangle?

Ans: Length = _____ cm, Width = _____ cm

(5 marks)

11. (a) In a school, 22 classrooms are needed for classes of 30 pupils each.

How many classrooms are needed if the number of pupils in the class increases to 33 pupils?

Ans: _____ classrooms

- (b) Light from the sun takes about 480 seconds to reach the earth.

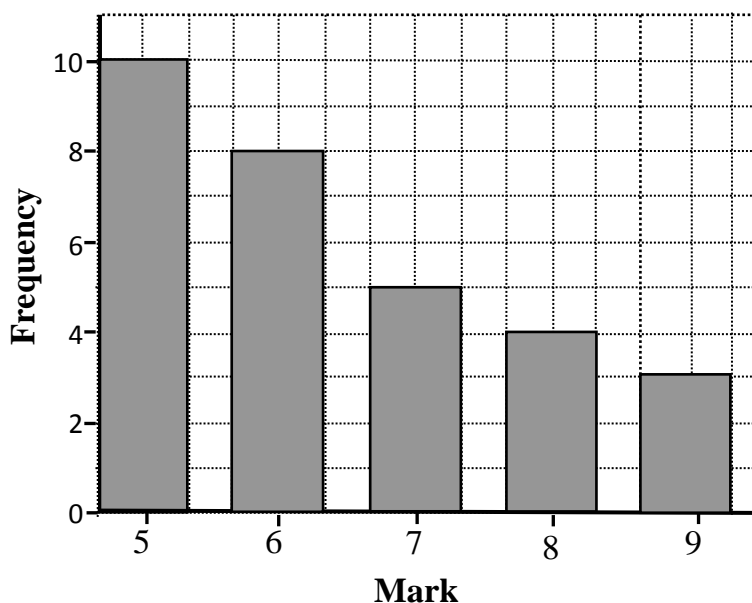
Light travels at 299 792 km/sec. **How far** is the sun from the earth?

Give your answer **in standard form**, correct to **3 significant figures**.

Ans: _____ km

(5 marks)

12. (a) This bar chart shows the results of a test taken by 30 students.



(i) Use the bar chart to complete the frequency table.

Mark	5	6	7	8	9
Frequency					

(ii) Write down the mode.

Ans: _____

(iii) Find the median mark.

Ans: _____

(iv) Calculate the mean mark.

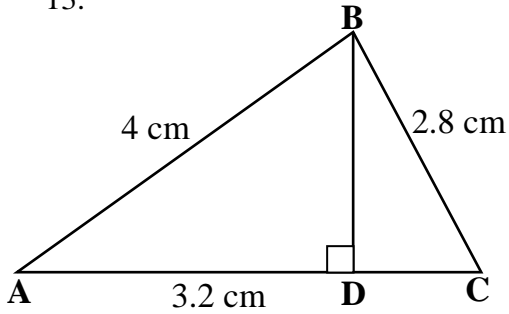
Ans: _____

(b) 12 boys and 8 girls **take another** test. The mean mark of these 20 students is 7.
Calculate the total marks of these 20 students.

Ans: _____

(9 marks)

13.



In figure ABCD, $AB = 4$ cm, $AD = 3.2$ cm and $BC = 2.8$ cm.

(a) Calculate the length of BD

Ans: _____ cm

(b) Calculate the length of AC, giving your answer correct to 3 significant figures.

Ans: _____ cm

(5 marks)

14. (a) A computer was priced at €750. It was sold for €525.
What was the **percentage discount**?

Ans: _____%

(b) After a **discount of 10%**, another computer was sold for €720.
What was the **original price** of this computer?

Ans: € _____

(5 marks)

END OF PAPER