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St Nicholas College Boys Secondary Naxxar
Half-Yearly Examinations **February 2016**

Track 3

FORM 3 MATHEMATICS TIME: 1 hr 30 min.
Main Paper

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Main	NC	Global Mark
Mark																		

DO NOT WRITE ABOVE THIS LINE

Name: _____ Class: _____

INSTRUCTIONS TO CANDIDATES:

Read all the questions carefully before you start answering.

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

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1. Work out an **approximation** for: $\frac{1987 + 421}{27.38}$

Answer: _____

(3 marks)

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2. Make q the **subject of the formula**: $p = \frac{3q-r}{s}$

Answer: q = _____

(3 marks)

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3. Martha buys a tracksuit for €70 **after** a 20% sale.
Work out the price of the tracksuit **before** the sale.

Answer: €_____

(3 marks)

4. In this question use the **method of trial and improvement** to find x, correct to 1 decimal place.

$$\boldsymbol{x^2 + x = 17}$$

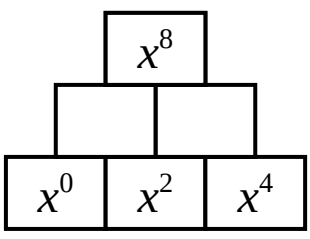
$\boldsymbol{x}$	$\boldsymbol{x^2 + x}$	**17**	**small/large**
let $x = 2$	$2^2 + 2 = 4 + 2$	6	small

Answer: $\boldsymbol{x}$ = _____

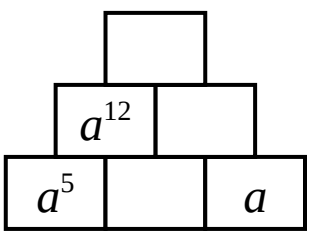
(3 marks)

5. Complete the following 'Indices Pyramids'. To work out a brick, **multiply** the two bricks underneath.

a)



b)



(4 marks)

6. a) 'FRUITY' is a new drink made up of **apple** juice, **cranberry** juice and **strawberry** syrup in the ratio of 3 : 2 : 1.
Work out the amount of cranberry juice needed to make 240 ml of 'FRUITY'.

Answer: _____ ml

b) John pours 27 ml of apple juice and 18 ml of cranberry juice.
How much strawberry syrup does he need to make the new drink?

Answer: _____ ml

(4 marks)

7. Expand and simplify:

a) $(x + 5)(x - 2)$

Answer: _____

b) $(x + 4)^2$

Answer: _____

(4 marks)

8. a) Draw a **regular** pentagon PQRST inscribed in a circle of **radius 4 cm**.

b) Fill in: The length of PQ is _____ cm.

(4 marks)

9. Rachel and Audrey compared the marks they obtained in their maths tests. Audrey was absent for the last test. All tests were out of 25 marks.

Rachel:	14	23	13	15	14	10	23
Audrey:	19	20	13	18	17	15	

a) Work out Rachel's **mean** mark.

Ans: _____

b) Kim said, "The highest marks were obtained by Rachel. So her results are better than Audrey's". Explain why Kim's argument may be wrong. Show any working.

_____

_____

(4 marks)

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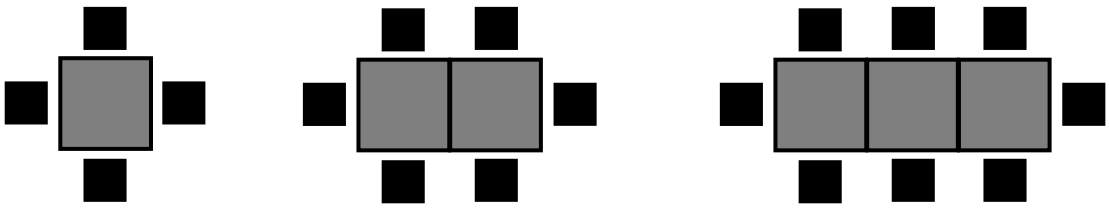
10. a) The n^{th} term of a sequence is $2n - 1$. Write down the first three terms of the sequence.

Answer: _____

b) A board room has tables, each of which can sit 4 people. When put together, the tables can seat people as shown.



1 table *2 tables* *3 tables*

i) How many people can sit at 4 tables?

Answer: _____ people

ii) How many people could sit at *n* tables?

Answer: _____ people

iii) How many tables are needed if 20 people attend a meeting in the board room?

Answer: _____ tables

(6 marks)

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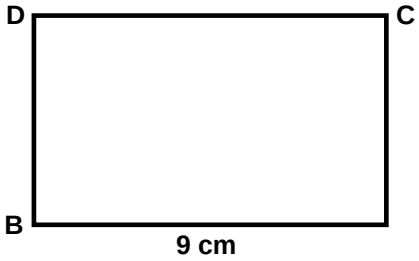
11. The diagram shows a rectangle ABCD in which, AB = 9 cm and AC = 11.5 cm.
Work out, giving your answers **correct to 1 decimal place:**

a) the length of BC;



Answer: _____ cm

b) the area of rectangle ABCD.

Answer: _____ cm^2

(6 marks)

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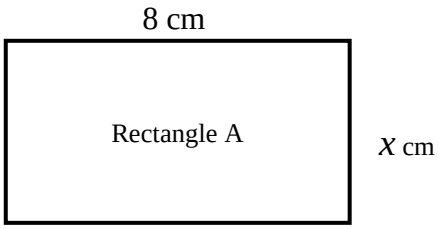
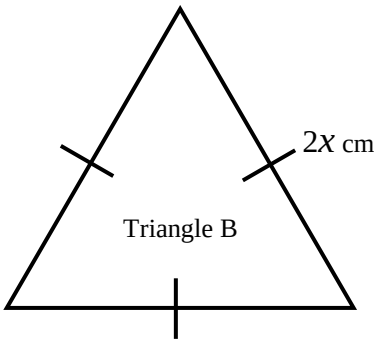
12. The diagrams show Rectangle A and Triangle B.





a) Write down an expression, in terms of *x*, for the perimeter of rectangle A.

Answer: _____

b) Write down an expression, in terms of *x*, for the perimeter of triangle B.

Answer: _____

c) Both shapes have the **same perimeter**. Use your answers in a) and b) to calculate the value of ***x***.

Answer: _____ cm

d) Hence work out the **perimeter** of rectangle **A**.

Answer: _____ cm

(7 marks)

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13. Mr. Borg drives from Hummel at a speed of 48 km/hr for 2½ hours. He then stops for half an hour to rest. Finally, he drives for another 30 km in 40 minutes to arrive at Kempa.

Work out:

a) the **distance** travelled before he stops for the rest;

Answer: _____ km

b) the **distance** between Hummel and Kempa

Answer: _____ km

c) the **speed**, in km/hr, at which he drives **after the rest**;

Answer: _____ km/hr

d) the **average speed** for the **whole journey**, correct to the nearest km/hr.

Answer: _____ km/hr

(8 marks)

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14. The table below shows the land area and population of six continents.

Continent	Land Area (km^2)	Population
Asia	4.44×10^7	4.06×10^9
Africa	3.02×10^7	1.11×10^9
Australia	7.69×10^6	2.04×10^8
Europe	1.04×10^7	7.30×10^8
North America	2.42×10^7	5.23×10^8
South America	1.78×10^7	3.80×10^8

a) Write down Australia's land area as an ordinary number.

Answer: _____

b) Write down the **names** of the continents in order of their **population**, starting from the smallest.

_____, _____, _____, _____, _____, _____.

c) Work out the **difference**, in **population** between Africa and Europe.

Answer: _____

d) The population density is calculated using the formula:

$$population\ density = \frac{population}{area}$$

Jack, Daniel and Scot work out the population density for Europe **correct to 3 significant figures**. Their working is shown below:

Jack's working

p.d. = $\frac{\text{population}}{\text{area}}$

= $\frac{7.30 \times 10^8}{1.04 \times 10^7}$

= 70.1923....

= 70.192

Daniel's working

p.d. = $\frac{\text{population}}{\text{area}}$

= $\frac{7.30 \times 10^8}{1.04 \times 10^7}$

= 70.1923....

= 70.2

Scot's working

p.d. = $\frac{\text{population}}{\text{area}}$

= $\frac{7.30 \times 10^8}{1.04 \times 10^7}$

= 70.1923...

= 70.19

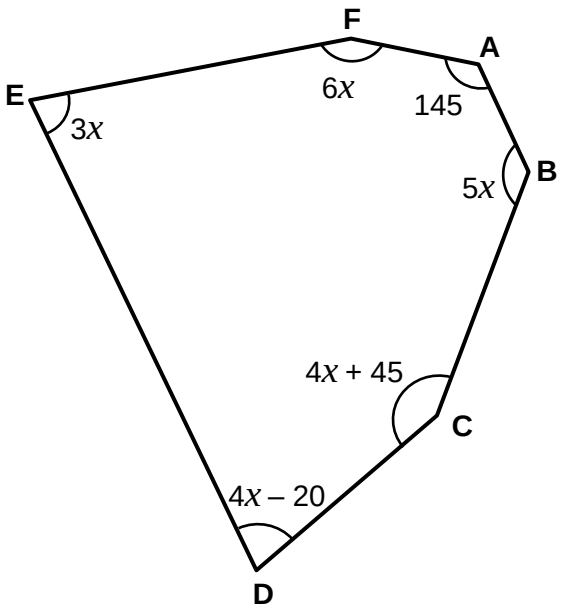
Whose **answer** is correct? Give an explanation for your answer.

_____

_____

(7 marks)

15. The figure shows an irregular six sided polygon ABCDEF. Angles marked are in degrees.



a) What is the **name** of a six-sided polygon? Answer: _____

b) Work out the **sum of the interior angles** in a six-sided polygon.

°

Answer: _____

c) Hence work out the value of x.

°

Answer: _____

d) Sides AB and DC are **produced** until they meet at P.
Work out the size of ∠BPC, giving reasons where necessary.

°

Answer: _____

(9 marks)

END OF EXAM