

JUNIOR LYCEUM ANNUAL EXAMINATIONS 2006

Educational Assessment Unit - Education Division

FORM 3

MATHEMATICS (Non-Calculator)

TIME: 10 minutes

Name _____

Class _____

Mark

- ANSWER ALL QUESTIONS.
- EACH QUESTION CARRIES 1 MARK.
- CALCULATORS, RULERS, PROTRACTORS AND OTHER MATHEMATICAL INSTRUMENTS ARE NOT ALLOWED.
- WRITE DOWN YOUR ANSWER ONLY IN THE SPACE PROVIDED.

**DO NOT
WRITE
IN
THIS
SPACE**

	QUESTION	Space for working if required
1.	Work out $\sqrt{\frac{9}{25}}$. Ans: _____	
2.	$1\frac{1}{4}$ litres of milk are mixed with 10 litres of coffee. What fraction of the mixture is milk? Ans: _____	
3.	Simplify: $27b^5 \div 9b$. Ans: _____	
4.	If $314 \times 28 = 8792$, find 3.14×2.8 . Ans: _____	
5.	What is the reciprocal of $1\frac{3}{4}$? Ans: _____	
6.	Elaine is 3 years younger than Eric. If Eric is x years old, how old will Elaine be next year? Ans: _____	
7.	A man has a bundle of Lm5 notes numbered consecutively from 232426 to 232440. What is their total value? Ans: _____	
8.	Put the following numbers in ascending order of magnitude: $4^0, 4^2, 4^{\frac{1}{2}}, 4^{-1}$ Ans: _____	
9.	Complete the following: The exterior angle of a triangle is equal to the _____ of the two interior _____ angles. Ans: _____	
10.	Expand: $3(2x - 3y)$. Ans: _____	

JUNIOR LYCEUM ANNUAL EXAMINATIONS 2006

Educational Assessment Unit - Education Division

FORM 3

MATHEMATICS

TIME: 1 h 50 min

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

DO NOT WRITE ABOVE THIS LINE

Name _____

Class _____

**CALCULATORS ARE ALLOWED BUT ALL NECESSARY WORKING
MUST BE SHOWN**

Answer All Questions.

1. From the numbers 18, 19, 20, 23, 25, 27, write down:

- a) a prime number _____
- b) a square number _____
- c) a number which is a multiple of 3 _____
- d) two numbers whose sum is 44 _____.

(4 marks)

2. The marks of 12 students in a test were 5, 5, 6, 6, 6, 7, 8, 8, 10, 10, 14, 17.

For these marks find:

- a) the mode _____
- b) the median _____
- c) the mean _____
- d) the range _____.

(4 marks)

3. Given that $ax + by = c$,

a) Make y subject of the equation.

Answer: _____

b) Work out the value of y when $a = 1$, $b = 2$, $c = 5$ and $x = -3$.

Answer: _____

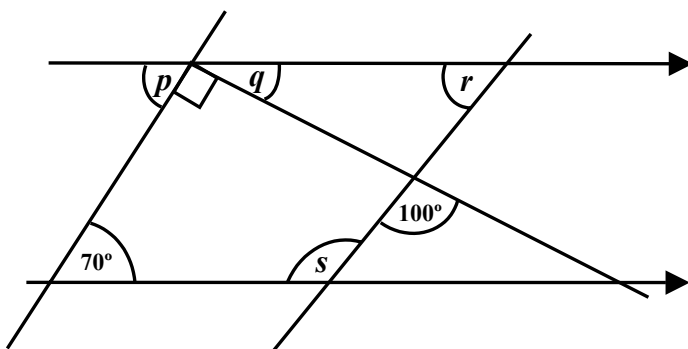
(4 marks)

4. The price of a camera is increased by 30%. Later in a sale, the price is reduced by 20% of its new value. This final price is Lm78. What was the original price?

Answer: _____

(4 marks)

5. Find the size of the angles marked p , q , r and s in this diagram.



Answer:

$p =$ _____

$q =$ _____

$r =$ _____

$s =$ _____

(4 marks)

6. a) Express 1080 in prime factors.

Answer: _____

b) Given that $1080 = 2^a \times 3^b \times 5^c$, state the values of a , b , c .

Answer: $a =$ _____ $b =$ _____ $c =$ _____

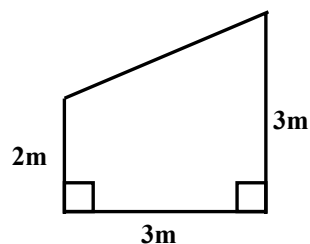
c) What is the smallest whole number by which 1080 must be multiplied to make a perfect square?

Answer: _____

(6 marks)

7. a) This sketch shows the side of a shed.

i) Find its area.



Answer: _____

ii) Find the volume of the shed, if it is 4m long.

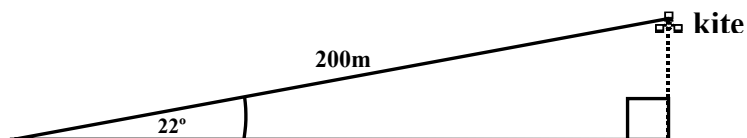
Answer: _____

b) A map has a scale of 2cm to represent 1km. Two villages are 8.4cm apart on the map. What is the actual distance between them?

Answer: _____

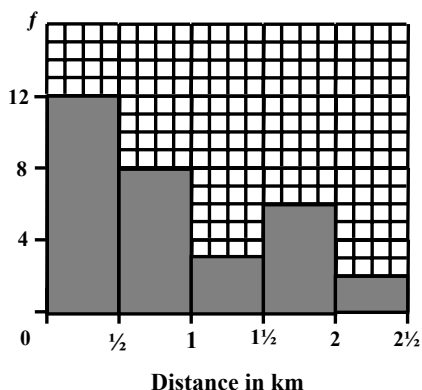
(6 marks)

8. a) When a kite is flying, the string makes an angle of 22° with the horizontal and the string is 200m long. How high is the kite?
(Give your answer correct to 3 sig. figures.)



Answer: _____

- b) The histogram shows the distances from home to school of a group of children. What is the probability that a child chosen at random from this group lives within 1km of the school?
(Give your answer as a fraction.)



Answer: _____

- c) A cylindrical candle has diameter 6cm and height 15cm. Calculate its volume in cm^3 . (Give your answer correct to the nearest whole number of cubic centimetres.)

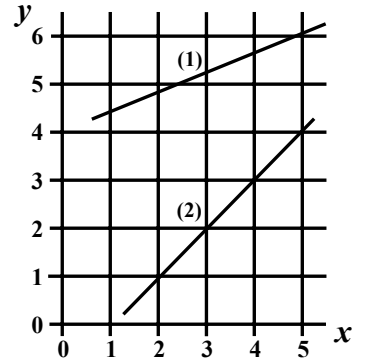
Answer: _____

(6 marks)

9. The diagram shows two lines marked (1) and (2).

a) State whether the following statements are TRUE or FALSE.

- i) The gradient of line 1 is positive. _____
- ii) The gradient of line 1 is greater than that of line 2. _____
- iii) Line 1 passes through the point (2, 5). _____
- iv) Points (2, 1) and (5, 4) lie on line 2. _____



b) Calculate the gradient of line 2.

Answer: _____

(6 marks)

10. a) Solve the equations:

i) $2d + 7 = 31 - 4d$

ii) $3(2x - 5) - 4(x + 7) = 13$

Answer: (i) _____ (ii) _____

b) Calculate the simple interest on Lm250 invested for 3 years at 8% per annum.

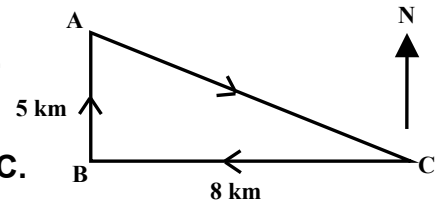
Answer: _____

(6 marks)

11. a) The mass of the Earth is 5.974×10^{21} tonnes. The moon's mass is 0.0123 of the Earth's mass. Work out the Moon's mass in tonnes, giving your answer in standard form correct to 3 significant figures.

Answer: _____

- b) One morning an explorer sets out from his base camp C. He walks 8 km due West and then 5 km due North to arrive at A. In the afternoon he returns to the camp along the path AC.



Calculate correct to the nearest km:

- (i) the distance AC

Answer: _____

- (ii) the total distance covered.

Answer: _____

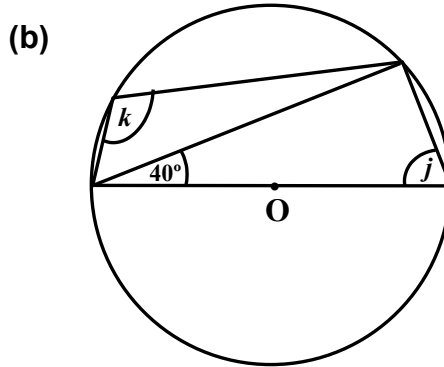
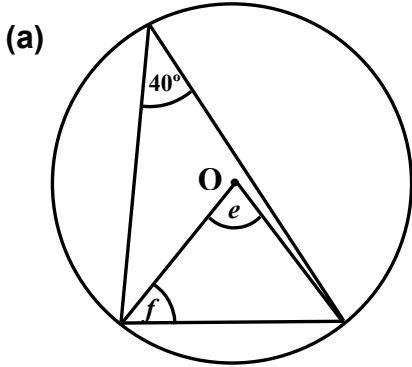
- c) Solve the simultaneous equations:

$$2x + y = 5 \quad , \quad 4x - y = 7$$

Answer: _____

(8 marks)

12. Find the marked angles in the diagrams below. Give reasons for your answers.
(O is the centre of the circle.)



Answer: (a) $e =$ _____
 $f =$ _____
 (b) $j =$ _____
 $k =$ _____

(8 marks)

13. On the graph paper provided, draw axes with the values for both x and y from -8 to 8 . Use 1 cm to represent 1 unit on both axes.

(a) Draw the triangle ABC where A is $(1, 1)$, B is $(4, 2)$ and C is $(3, 7)$.

(b) Draw the reflection of $\triangle ABC$ in the y -axis.
 Label the image of $\triangle ABC$ as $\triangle A_1 B_1 C_1$.
 What are the co-ordinates of the points A_1, B_1, C_1 ?

Answer: $A_1 =$ _____, $B_1 =$ _____, $C_1 =$ _____.

(c) Rotate $\triangle A_1 B_1 C_1$ about the origin through 180° .
 Label the image of $\triangle A_1 B_1 C_1$ as $\triangle A_2 B_2 C_2$.
 What are the co-ordinates of the points A_2, B_2, C_2 ?

Answer: $A_2 =$ _____, $B_2 =$ _____, $C_2 =$ _____.

(d) What single transformation would map $\triangle ABC$ into $\triangle A_2 B_2 C_2$?

Answer: _____

(8 marks)

14.a) Complete the following table for $y = x^2 - 4x + 3$.

x	-2	-1	0	1	2	3	4	5
x^2		1	0	1	4	9	16	25
$-4x$	8	4	0	-4		-12	-16	-20
$+3$	+3	+3	+3	+3	+3	+3	+3	+3
y	15		3	0	-1		3	8

b) Draw the graph of $y = x^2 - 4x + 3$ for values of x from -2 to 5.
Take 2cm as 1 unit on the x -axis and 1 cm as 1 unit on the y -axis.

c) What is the minimum value of y ? Give the corresponding value of x .

Answer: $y =$ _____ $x =$ _____

d) Use your graph to solve the equation $x^2 - 4x + 3 = 0$.

Answer: _____

(8 marks)

15. Complete the table below for regular polygons.

Number of sides	Name	Sum of exterior angles	Size of an exterior angle	Sum of interior angles	Size of an interior angle
3	equilateral triangle	360°	120°	180°	60°
4			90°	360°	90°
	regular			540°	108°

	pentagon				
6	regular hexagon		60°		120°
	regular octagon		45°	1080°	

(8 marks)

End of paper