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:_____	

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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)

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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)

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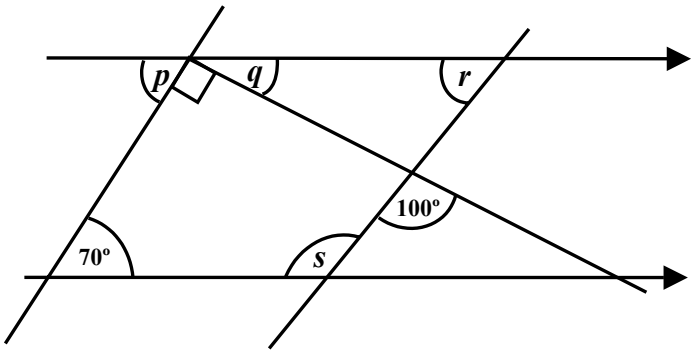
5. Find the size of the angles marked p, q, r and s in this diagram.



Answer:

p = _____

q = _____

r = _____

s = _____

(4 marks)

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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)

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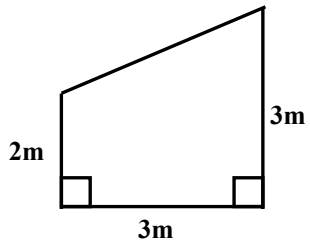
7. a) This sketch shows the side of a shed.



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)

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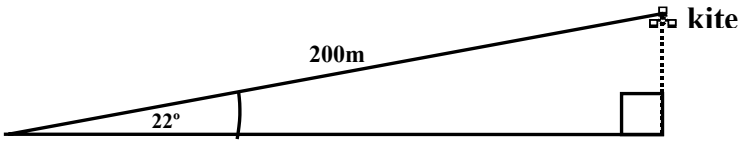
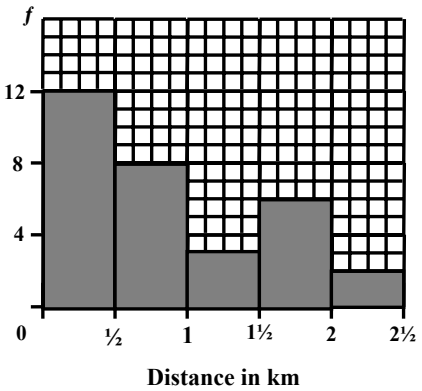
8. a) When a kite is flying, the string makes an angle of 22º with the horizontal and the string is 200m long. How high is the kite? (Give your answer correct to 3 sig. figures.)



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.)



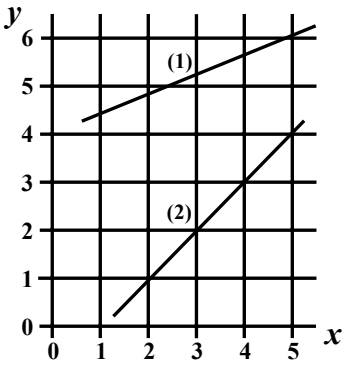
Answer: _____

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)

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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)

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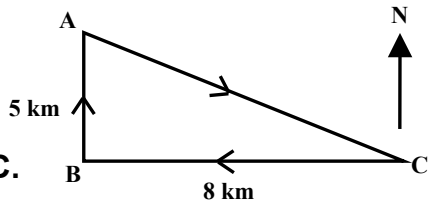
11. a) The mass of the Earth is 5.974×10^{21} tonnes. The moon's mass is 0.0123 of the Earth's mass. Work out the Moon's mass in tonnes, giving your answer in standard form correct to 3 significant figures.

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:

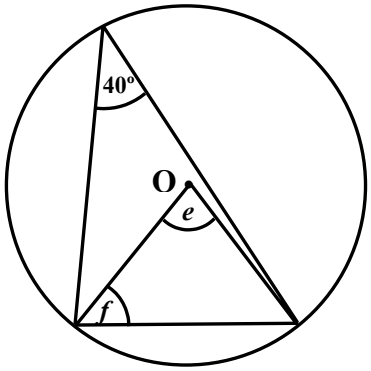
$2x + y = 5$, $4x - y = 7$

Answer: _____

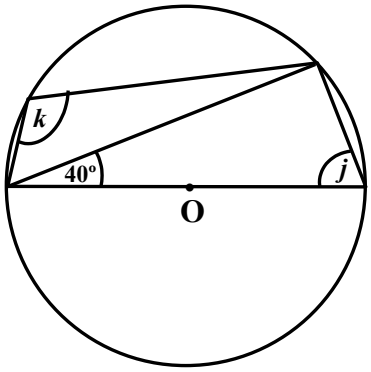
(8 marks)

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

(a)



(b)



Answer: (a) ***e*** **= _____**

f **= _____**

(b) ***j*** **= _____**

k **= _____**

(8 marks)

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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 Δ ABC in the y-axis.
Label the image of Δ ABC as $\Delta A_1 B_1 C_1$.
What are the co-ordinates of the points A_1, B_1, C_1?

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

(c) Rotate $\Delta A_1 B_1 C_1$ about the origin through 180°.
Label the image of $\Delta A_1 B_1 C_1$ as $\Delta A_2 B_2 C_2$.
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 Δ ABC into $\Delta A_2 B_2 C_2$?

Answer: _____

(8 marks)

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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)

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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	360º	120º	180º	60º
4			90º	360º	90º
	regular			540º	108º

	pentagon				
6	**regular hexagon**		**60º**		**120º**
	regular octagon		**45º**	**1080º**	

(8 marks)

End of paper