JUNIOR LYCEUMS ANNUAL EXAMINATIONS - 2000

Educational Assessment Unit - Education Division

FORM III   **MATHEMATICS (MENTAL)**   **TIME: 15 minutes**
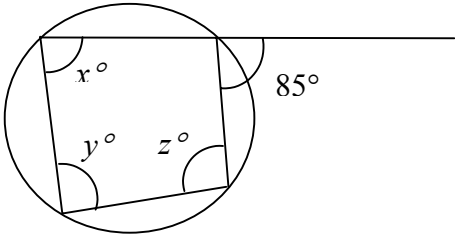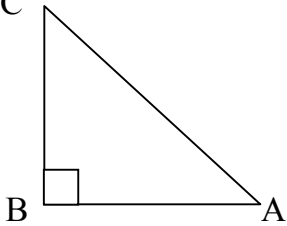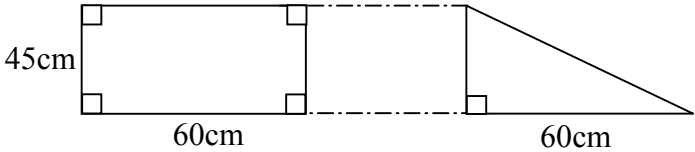

Name _____

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	ANSWER
1. How many thirds are there in three wholes?	
2. Simplify : $a^2 + a^2$	
3. Write down a number for x such that $x > 0$ and $x < 2$.	
4. Which angle from the diagram is equal to 85°?	
5. 10 shirts cost Lm3 each and 5 trousers cost Lm15 each. Write down ,in its lowest terms, the ratio *cost of ten shirts : cost of five trousers.*	
6. The mean of three numbers is 7. Two of the numbers are 5 and 10. What is the third number?	
7. C In the figure the angle A is 45° and AB is 6.3cm long. What is the length of BC?	
8. A store offered a discount of 25% on all goods bought during a sale. What was the sale price for a television set that cost Lm 400 before the sale?	
9. What is the area of the triangle?	
10. The probability of coming late to school one day is 30%. What is the probability of coming on time?	

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FORM 3 **MATHEMATICS (Main Paper)** **TIME: 1 h 45 min**

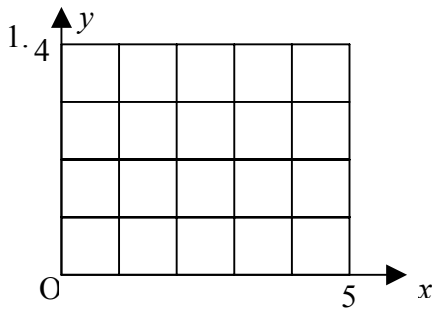| Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total Main	Mental	**Global Mark**
Mark																		

DO NOT WRITE ABOVE THIS LINE

Name _____ Class _____

> CALCULATORS ARE ALLOWED BUT ALL NECESSARY WORKING MUST BE SHOWN

ANSWER ALL QUESTIONS.

1.

O is the origin. A (1 , 1) and B (5 , 4) are two points.
(a) Mark and label the two points on this grid.

(b) Write down the gradient of the line AB as a fraction.

(4marks)

2. Find the value of (a) $4x^2 - 49$ when $x = -2$; (b) Work out and give your answer correct to 3 significant figures

$$\frac{7.152 \times 10^2}{3.5 \times 2.4}$$

(4marks)

3. (a) Increase Lm250 by 10%.

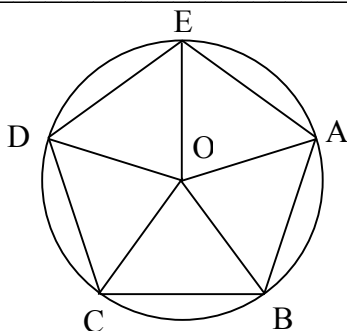(b) A video recorder bought for Lm200 is sold for Lm225. What is the percentage profit?

(4marks)

4. (a) A number v is equal to the sum of a number y and twice a number x. Write down a formula for v.

(b) Work out the value of x when $y = 3$ and $v = 11$.
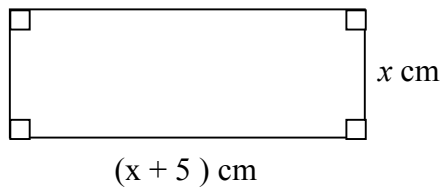
(4marks)

5.

ABCDE is a regular pentagon. O is the centre of the circle. Find the size of each angle of the triangle OAB.

(4marks)

6. (a) Solve the equation $x(x - 2) = 0$.

(b) The area of this rectangle is 50 cm². Form an equation in x and solve it to find the length and width of the rectangle.

x cm

$(x + 5)$ cm

_____(6marks)

7.

Mark	0 — 9	10 — 19	20 — 29	30 — 39	40 — 49	50 — 59
Frequency	10	12	26		28	21

The table shows the distribution of marks obtained by 142 pupils sitting a test.
(a) State the number of students in the range 30 — 39.   _____

(b) Which is the modal group?   _____

(c) Find the group in which the median lies.   _____

_____(6marks)

8. Simplify the following expressions:
(a)

(i) $\dfrac{x}{2} \times \dfrac{8}{x^3}$

(ii) $\dfrac{(x-2)}{4} \times \dfrac{1}{(x^2 - 4x + 4)}$

(b) $\mathbf{A} = \begin{pmatrix} 2 & 0 \\ -1 & 3 \end{pmatrix}$ $\mathbf{B} = \begin{pmatrix} -1 & 1 \\ -2 & 4 \end{pmatrix}$

Find the matrix $\mathbf{X}$ if $\mathbf{A} + \mathbf{X} = \mathbf{B}$.

_____(6marks)

9. Ms. Cini goes shopping on Monday and Thursday. On Monday she buys 2kg of flour and 1kg of sugar. On Thursday she buys 3kg of flour and 2kg of sugar.
(a) Show this information in a 2×2 matrix $\mathbf{S}$.

$$\mathbf{S} = \begin{matrix} \text{Mon} \\ \text{Thu} \end{matrix} \begin{pmatrix} & \end{pmatrix}$$
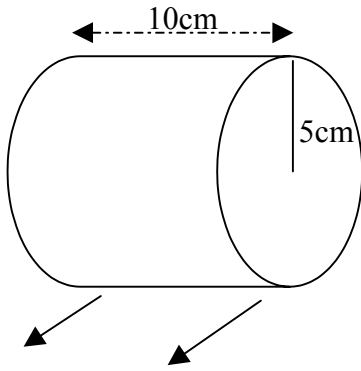
(b) Flour costs 40c per kg and sugar costs 35c per kg. Show this information in a 2×1 matrix $\mathbf{C}$.

$$\mathbf{C} = \begin{matrix} \text{Flour} \\ \text{Sugar} \end{matrix} \begin{pmatrix} \end{pmatrix}$$

(c) Work out the product $\mathbf{SC}$ to find the total cost of Ms. Cini's shopping on Monday and on Thursday.

_____ (6marks)

10. *(In this question give your answer correct to 3 significant figures.)*

(a) Work out the volume of the cylinder.

(b) Work out the curved surface area of the cylinder.

(c) The cylinder is rolled three complete revolutions, on a table, in the direction of the arrows. Calculate the area covered on the surface of the table by the cylinder.

(Curved surface area of a cylinder = 2πrh)

(6marks)

11.
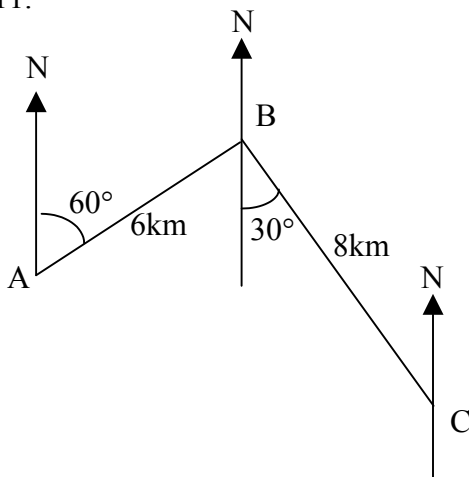
The figure represents the positions of three towns A, B, C.

(a) Write down the size of angle ABC.   _____

(b) What is the bearing of C from B?   _____

(c) Work out the direct distance of C from A.   _____

(d) Find the angle ACB to the nearest degree.   _____

(e) What is the bearing of A from C to the nearesst degree?
_____
(8marks)

12. (a) Complete the table to find the value of $(x - 1)(x + 2)$ when $x = 0$.

x	−3	−2	−1	0	1	2
$(x - 1)$	−4	−3	−2		0	1
$(x + 2)$	−1	0	1		3	4
$y=(x - 1)(x + 2)$	4	0	−2		0	4

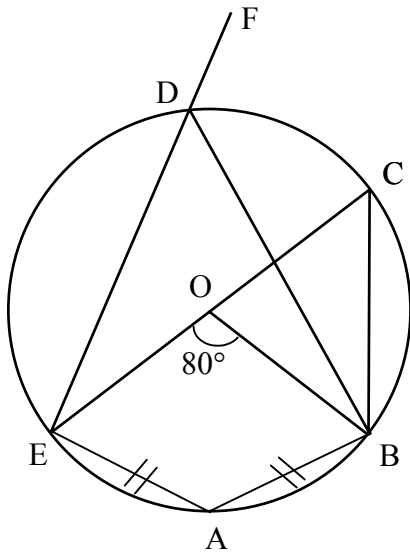(b) Draw the graph of $y = (x - 1)(x + 2)$ for values of x in the range $-3 \leq x \leq 2$.
    Take 2cm to represent 1 unit on both axes.
(c) On your graph draw the vertical line of symmetry of this curve.
(d) From your graph write down the smallest value of y and the corresponding value of x.

(8marks)

13.

F

D

C

O

80°

E

B

A

The points A, B, C, D, E are on a circle centre O. EA = AB.
Calculate, giving reasons for your answers, the size of

(a) ∠OCB

(b) ∠EAB

(c) ∠BDF

(d) ∠OBA

_____(8marks)
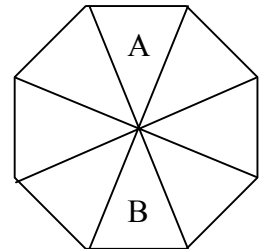
14. (a) Solve the simultaneous equations :
$2x + 3y = 9$
$4x + y = 8$

(b) The figure is a regular octagon.
Write down the ratios of the following
areas in their lowest terms.
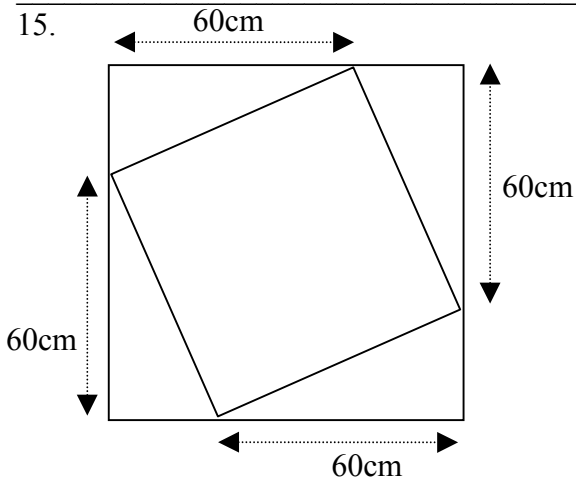(i) A : B

A

B

(ii) (A + B) : whole octagon.

_____(8marks)

15.

60cm

60cm

60cm

60cm

A square board of side 90cm has a smaller square
drawn inside it as shown in the diagram.
(a) (i) Find the area of one of the triangles.

(ii) Find the area of the smaller square.

(b) The square board is fixed on the wall and a dart is
thrown at the board. Given that the dart lands on the
board work out
(i) the probability that it will land inside the smaller square

(ii) the probability that it will land in one of the triangles.

_____(8marks)