

END OF TERM 1 EXAMS

MATHEMATICS

FORM THREE

PAPER 2

TIME: 2 ½ HOURS

NAME.....ADM NO:.....

SIGN..... INDEX NO:.....

SECTION A (50MARKS)

Answer all questions in this section in the spaces provided.

1. Evaluate: $\frac{3}{8}$ of $\left\{ 7\frac{3}{5} - \frac{1}{3} \left[1\frac{1}{4} + 3\frac{1}{3} \right] \times 2 \frac{2}{5} \right\}$ (2mks)

2. Solve the simultaneous equations

$$xy = 4$$

$$x + y = 5$$

(4mks)

3. A man invests Ksh.24, 000 in an account which pays 16% interest p.a. the interest is compounded quarterly. Find the amount in the account after $1\frac{1}{2}$ years. **(3mks)**

4. Given that position vectors of points A and B are $\underline{a} = \begin{pmatrix} -3 \\ 2 \end{pmatrix}$ and $\underline{b} = \begin{pmatrix} 2 \\ 5 \end{pmatrix}$ and C is a point on AB such that $AC : CB = 1 : 2$. Find the coordinates of the point C. **(3mks)**

5. The table below shows the number of goals scored in 40 soccer matches during a certain season.

No. of goals	0	1	2	3	4	5	6	7
No. of matches	3	9	6	8	5	5	2	1

Calculate the mean number of goals scored per match. **(3mks)**

6. Simplify:

$$\frac{x^2 - xy}{(x + y)^2} \div \frac{(x - y)^2}{x^2y - y^3}$$

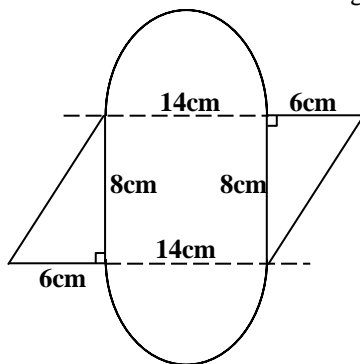
(3mks)

7. From a point 20m away on a level ground the angle of elevation to the lower window line is 25° and the angle of elevation to the top line of the window is 34° . Calculate the height of the window.

(3mks)

8. Find the distance round the figure given below. (Take $\pi = \frac{22}{7}$)

(2mks)

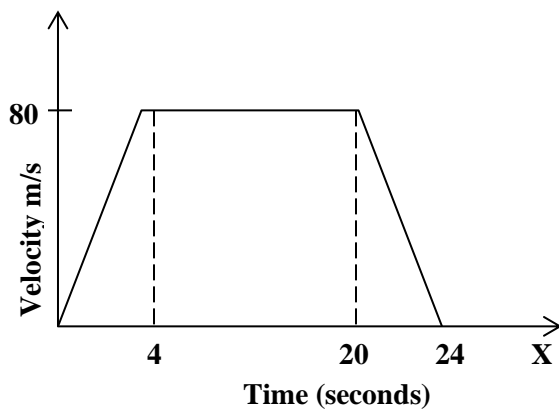


9. Find all the integral values of χ which satisfy the inequalities. (3mks)

$$\chi + 8 > 4\chi - 6 \geq 3(4 - \chi)$$

10. Agnes paid rent which was $\frac{1}{10}$ of her net salary. She used $\frac{1}{2}$ of the remaining amount to make a down payment for a plot. She gave her mother Kshs. 2,500 and did shopping worth Kshs. 7,500 for herself. She saved the remainder which was Ksh. 12,500. How much was the down payment that she made. (4mks)

11. The figure **below** is a velocity time graph for a car.



(a) Find the total distance traveled by the car. (2mks)

(b) Calculate the deceleration of the car. (2mks)

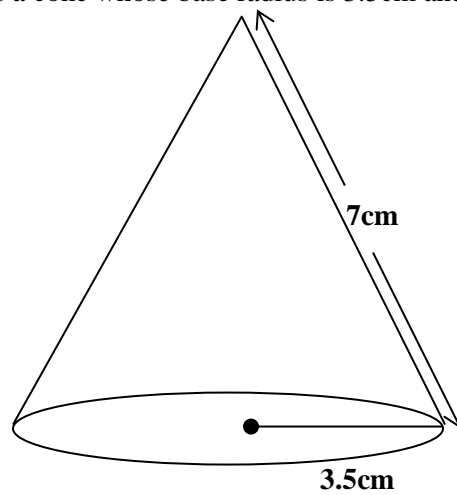
12. A chord **PQ** of length 15cm subtends an angle of 65° at the circumference centre **O**. Find the radius of the circle. (3mks)

13. The interior angles of a hexagon are $2x + 5$, $4x - 5$, $4x + 5$, $3x$, $4x - 20$ and $2x$. Find the value of **x**. (3mks)

14. A line passes through the point $(-1, 2)$ and has gradient $-\frac{1}{2}$. Write down its equation in the form $ax + by = c$ (3mks)

15. Given $x = 13.4\text{cm}$ and $y = 4.3\text{ cm}$. calculate the percentage error in $\frac{X}{Y}$ correct to 4 d.p
(4mks)

16. The figure below is a cone whose base radius is 3.5cm and slant height 7cm . The net of the cone is a sector of a circle.



- (a) Find the angle subtended at the centre of the sector. (2mks)

- (b) Draw the net of the solid. (1mk)

SECTION II (50 MARKS)

Answer any five questions from this section in the spaces provided.

17. A straight line L_1 has a gradient $^{-1/2}$ and passes through point P (-1, 3). Another line L_2 passes through the points Q (1, -3) and R (4, 5). Find.

(a) The equation of L_1 . (2mks)

(b) The gradient of L_2 . (1mk)

(c) The equation of L_2 . (2mks)

(d) The equation of a line passing through a point S (0, 5) and is perpendicular to L_2 . (3mks)

(e) The equation of a line through R parallel to L_1 . (2mks)

18. (a) Given that $y = 7 + 3\chi - \chi^2$, complete the table **below**. (2mks)

χ	-3	-2	-1	0	1	2	3	4	5	6
y	-11			7						-11

- (b) On the grid provided and using a suitable scale draw the graph of $y = 7 + 3\chi - \chi^2$. (2mks)
- (c) On the same grid draw the straight line and use your graph to solve the equation $\chi^2 - 4\chi - 3 = 0$. (3mks)
- (d) Determine the coordinates of the turning point of the curve. (2mks)

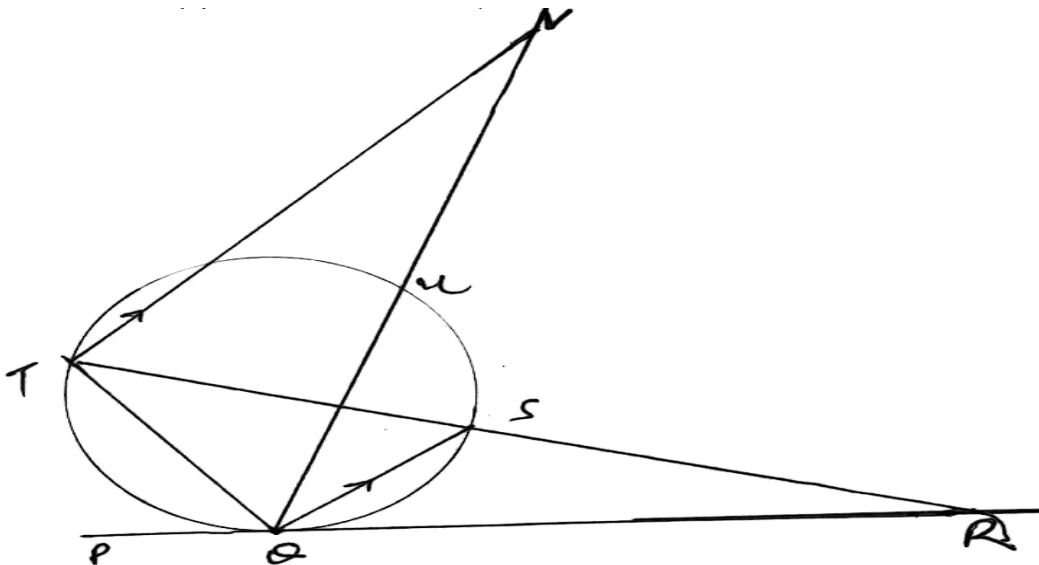
19. From a reservoir, water flows through a cylindrical pipe of diameter 0.2m at a rate of 0.35m per second.

- (a) Determine the number of liters of water discharged from reservoir in one hour. (4mks)

- (b) The water flows from the reservoir for 18 hours per day for 25 days per month and serves a population of 2500 families. Determine the average consumption of water per family per month giving your answer to the nearest 100 litres. (4mks)

- (c) The water is charged at the rate of sh.4.50 per 100 litres. Calculate the average water bill per family per month. (2mks)

20. In the figure below PQR is a tangent to the circle at Q. TS is a diameter and TSR and QUV are straight lines. QS is parallel to TV. Angles $\text{SQR} = 40^\circ$ and $\text{TQV} = 55^\circ$.



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(a) Find the following angles giving reasons each case.

(i) $\angle QTS$ (2mks)

(ii) $\angle QRS$ (2mks)

(iii) $\angle QVT$ (2mks)

(iv) $\angle QUT$ (2mks)

(b) Given that $QR = 8\text{cm}$, and $SR = 4\text{cm}$. Find the radius of the circle. (2mks)

21. Mr. Kimutai a teacher from Tuiyotich Secondary School earns K£ 12000 per annum and lives in a house provided by the employer at a minimum rent of Ksh.2000 per month. He gets a family relief of K£ 1320p.a. and is entitled to a relief of 10% of his insurance of K£ 800p.a.

(a) Calculate his annual tax bill based on the table below. (6mks)

<u>Income slab in K£ p.a.</u>	<u>Rate</u>
1 – 2100	10%
2101 – 4200	15%
4201 – 6300	25%
6301 – 8400	35%
Over 8400	45%

(b) Kimutai other deductions include.

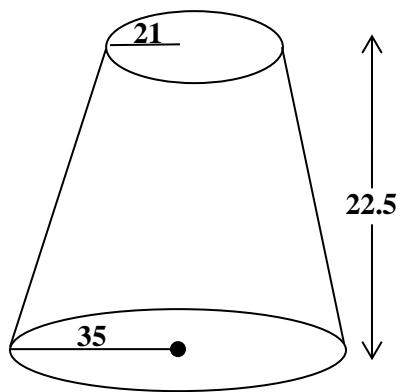
- W.C.P.S = sh 600.00pm

- NHIF = sh 500.00pm

Calculate Kimutai's net salary monthly.

(4mks)

(a) 22. The diagram represents a solid frustum with base radius of 35cm and top radius of 21cm. The frustum is 22.5cm high and is made of a metal whose density is 4g/cm^3 . Taking $\pi = \frac{22}{7}$,



Calculate;

(i) The volume of the metal that makes the frustum.

(6mks)

(ii) The mass of the frustum. (2mks)

(b) The frustum is melted in down and recast into a solid cube in the process 20% of the metal is lost. Calculate to 2d.p the length of each side of the cube. (2mks)

23. Four points **B**, **C**, **Q** and **D** lie on the same plane. Point **B** is 42km due southwest point **Q**. Point **C** is 50 km on a bearing of $S60^\circ E$ from **Q**. Point **D** is equidistant from **B**, **Q** and **C**.

(a) Using the scale: 1cm represents 10km, construct a diagram showing the positions of **B**, **C**, **Q** and **D**. (5mks)

(b) Determine the

(i) Distance between **B** and **C** (1mk)

(ii) Bearing of **D** from **B** (2mks)

(c) Find the distance and bearing of **D** from **C**. (2mks)

24. (a) A small field was surveyed and the measurements recorded in a surveyor's field book as in the table below.

		100	0	F
E	30	65	40	D
		50		
		30	25	B
C	20	20		
A	0	0		

(i) Using a scale of 1cm to 10m make an accurate drawing of the map of the field. (4mks)

(ii) Find the area of the field.

(3mks)

(iii) Assuming that the baseline in (a) runs in a northern direction give the position of **D** relative to A using bearing and distance.

(3mks)