

GATITU SECONDARY SCHOOL, P.O. BOX 327 – 01030, GATUNDU.

FORM 4 MATHEMATICS MID TERM EXAMINATION. TERM I 2016

NAME: _____ ADM: _____ CLASS: _____

1. Use logarithms to evaluate

$$3 \sqrt[3]{\frac{1.23 \times 0.0468}{\text{Log } 6}}$$

(4mks)

2. Simplify $\frac{x-3}{x+3} - \frac{x^2-3x}{x^2-9}$ (3mks)

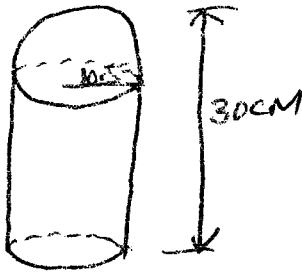
3. The sum of the ages of three sisters Rhoda, Sally and Tabitha is 39 years. Sally is twice as old as Tabitha and one and a half times as old as Rhoda. Determine their ages. (3mks)

4. A perpendicular line is drawn from a point (1, 2) to the line $3y + 2x + 1 = 0$.
Find the equation of the perpendicular in the form $y = mx + c$. (3mks)

5. Simplify $\frac{\sqrt{15}}{\sqrt{5} - \sqrt{3}} - \frac{\sqrt{15}}{\sqrt{5} + \sqrt{3}}$ (3mks)

6. Make M the subject of the formula $b = \frac{nm}{n - m}$ (3mks)

7. The solid shown below consists of a cylinder and a hemisphere of equal radius 10.5cm. If the height of the solid is 30cm, find its volume. (4mks)



8. Solve $9^{x+1} = 243$ (3mks)

9. Expand $(a - b)^5$. Use your expansion to find the value of 1.96^5 (4mks)

10. A wildlife club has 13 form students. The Club has three officials. Find the probability that two of the officials are form fours. (4mks)

11. A coffee blender buys two grades of coffee at sh 60 and sh 80 per packet. Find the ratio in which he should mix them so that by selling the mixture at sh 90, a profit of 25% is realized. (4mks)

12. Find the centre and the radius of a circle whose equation is given by

$$x^2 + y^2 - 26y + 14x = 38.$$

(4mks)

13. Given that $X : y = 2 : 3$. Find the ratio $(5x - 4y) : (x + y)$ (4mks)

14. One pipe can empty a cistern in 8 hours, another in 6 hours and another in B hours. How long will it take to empty the cistern if all the three pipes are used together. (4mks)

15. Find the value of X in
 $(\log X)^2 - \log X^{15} + 56 = 0$ (4mks)

16. A kite ABCD has vertices of A(1,1) B(6, 2) C(6, 6) and D(2, 6)
- a) On the same axes
- i) Draw the image $A' B' C' D'$ of ABCD under a rotation of $+90^\circ$ about (0,0) (3mks

ii) Draw the image $A'' B'' C'' D''$ of $A' B' C' D'$ under reflection in $y = x$ (3mks

iii) Draw the image $A''' B''' C''' D'''$ of $A'' B'' C'' D''$ under a reflection $x = 0$ (2mks

iv) Find a single matrix of transformation which maps ABCD onto $A''' B''' C''' D'''$ (2mks

17. Draw the graph of $y = -x^2 + 4x - 1$ for $-1 \leq x \leq 5$ (5mks)

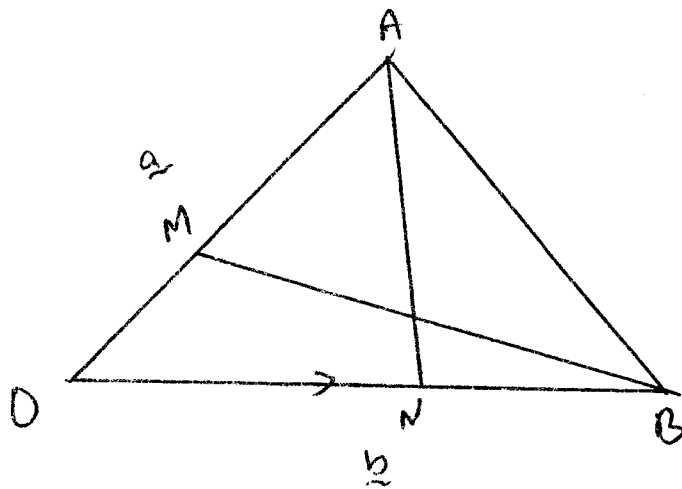
i) On the same axes draw the graph of $y = 2x - 3$ (1mk)

ii) Use your graph to solve the following

(a) $x^2 - 4x + 1 = 0$ (2mks)

(b) $x^2 - 2 - 2 = 0$ (2mks)

18. In a triangle OAB , M and N are points on OA and OB respectively, such that $OM : MA = 2:3$ and $ON : NB = 2:1$. $OA = a$ and $OB = b$



a) Express in terms a and b

i) BM

(ii) AN

(2mks

b) Taking $BX = t BM$ and $AX = hAN$, where t and h are scalars, Find two expressions for OX .
(4mks

c) Find the values of t and h

(4mks

19. In driving to work Peter has to pass through three sets of traffic lights. The probability that He will stop at any of the lights is $\frac{3}{5}$.

a) Draw a tree diagram to represents the above information.

(2mks

b) Using the diagram, determine the probability that on any one journey, she will have to stop at:

i) All the tree sets.

(2mks

ii) Only one of the sets.

(2mks

iii) Only two of the sets

(2mks

iv) None of the sets

(2mks

20. The table below gives values of Q with corresponding values of S

Q	90.1	222.3	371.2	693.3	4450.1	11,000
S	60	105	147	226	780	1500

a) Q and S are connected by law of the form $Q = K S^n$, where K and n are constants. Draw a suitable straight line graph and determine the values of K and n . (8mks

b) State the value of

i) Q when $S = 113$

(2mks

ii) S when $Q = 400$

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