MANGU HIGH SCHOOL

121/1
MATHEMATICS
PAPER1
JULY 2015
TIME: 2½ HOURS

NAME: _____

ADM NO: _____ CLASS: _____

Kenya Certificate of Secondary Education
Mock Examinations
Mathematics
Paper 1
2½ Hours.

INSTRUCTIONS TO CANDIDATES

1. Answer **all** questions in **Section I** and **Section II**
2. Answer **any five** questions in **section II**. All questions in this section carry **Equal Marks.**
3. Show **all** your working in the spaces provided below each question.
4. **Candidates should Check the question paper to ascertain that no questions are missing.**

For Examiner's Use only

Section I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total

Section II

17	18	19	20	21	22	23	24	Total

Grand Total

This paper consists of **18 printed pages.** Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.

Turn Over

SECTION I (50 MARKS)

1. Using the logarithm tables solve the following, give your answer to 4 significant figures (3 mks)

$$\left(\frac{\sqrt{0.004636}}{6.373\log 4.948}\right)^{-1/3}$$

2. Kamau toured Switzerland Germany. In Switzerland he bought his wife a present worth 72 Deutsche marks. Find the value of the present in:

a) Swiss Francs

b) Kenya shillings correct to the nearest sh, if
1 Swiss Franc = 1.25 Deutsche marks
1 Swiss Franc = 48.2 Kenya shillings (3 mks)

3. Without using tables or a calculator simplify (3 mks)

$$\frac{\sin^2 60^0 - \tan^2 30^0}{\cos^2 45^0} - \frac{5}{6}$$

4. Use tables of cubes, square roots and reciprocals to evaluate (3 mks)

$$\frac{4}{(0.3485)^3 - \sqrt{437.6}}$$

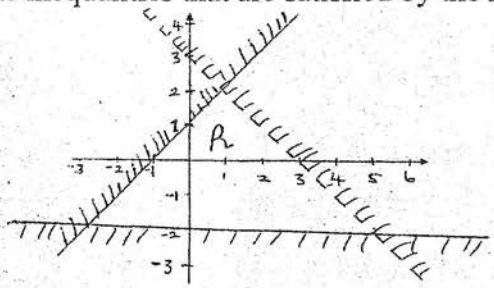
5. Find the value of $^a/_b$ given the following simultaneous equations (4 mks)

$$\frac{\log x^{a+2b}}{\log x^{a-b}} = 3$$

$$\log x^{2a+3b} = \log x^2$$

6. The mean of 5 numbers is 12. The numbers are in the ratio 1:2:3:4:5. Find the smallest and the largest numbers (3 mks)

7. Find the inequalities that are satisfied by the region R below (3 mks)



8. Point PQRS are vertices of base of a right pyramid whose a small Top pyramid VTUZW has been removed to form a frustum. The frustum stands on a rectangular base measuring 32cm by 24cm and a rectangular top measuring 8cm by 6cm the top is parallel to the base and ¾ up the vertical height of the original pyramid. Each slant edge of the original pyramid is 45cm long. Calculate to the nearest whole number the volume of the frustum (4 mks)

9. A matatu travelling at 99km/hr passes a checkpoint at 9.00am. A police patrol car traveling at 132km/hr in the same direction passes through the police check point at 9.15am. If the matatu and the police patrol car continue at their uniform speeds, calculate at what time the police car will overtake the matatu (3 mks)

10. Find a if the vectors $(a + 1)\underline{i} + 4\underline{j}$ and $-2\underline{i} + 6\underline{j}$ are parallel. (3 mks)

11. From the roof of a house the angle of elevation of the top of a tree is 40^0 and the angle of depression of the bottom of the tree from the top of the house is 25^0. If the house is 12m tall, calculate the highest of the tree (3 mks)

12. Given that the ratio x: y = 2 : 3, find the ratio (5x- 2y) : (x + y) (3 mks)

13. Me. Lee walks 5km on a bearing of 315^0 from Thika town and then walks due south to Juja Mall which is 8km from Thika town. Calculate the bearing of Juja Mall from Thika town (3 mks)

14. Two similar containers weigh 40kg and 625kg respectively. If the surface area of the smaller one is $112cm^2$, find the surface area of the bigger one in m^2 (3 mks)

15. Find the exact value of (3 mks)

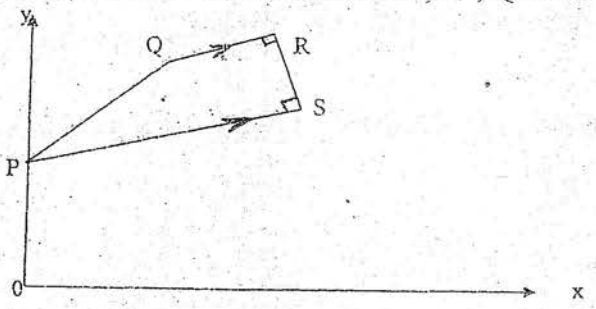
$$2.41\dot{\dot{3}} - 0.3\dot{\dot{2}}$$

16. The figure below is a section of a school logo. The logo has a rotational symmetry of order 3 about 0. Complete the figure to show the logo (3 mks)

SECTION II (50 MARKS)

Answer only five questions in this section in the spaces provided

17. The diagram below is a sketch showing a figure PQRS in which PS is parallel to QR. PS and RS are perpendicular at S. The co-ordinates of P, Q and R are (0, 2), (3, 13) and (12, 16) respectively



Find the

a) Equation of PS and RS (2 mks)

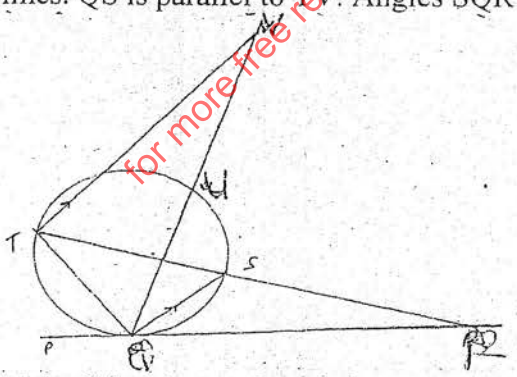
b) Co-ordinates of S (2 mks)

The line PQ produced meets the line SR produced at T. Find the;

c) Co-ordinates of T (2 mks)

d) Ratio of the area of triangle PTR to the area of trapezium PQRS (4 mks)

18. 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 SQR = 40^0 and TQV = 55^0



a) Find the following angles giving reasons each case

i) <QTS (2 mks)

ii) <QRS (2 mks)

iii) <QVT (2 mks)

iv) <QUT (2 mks)

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

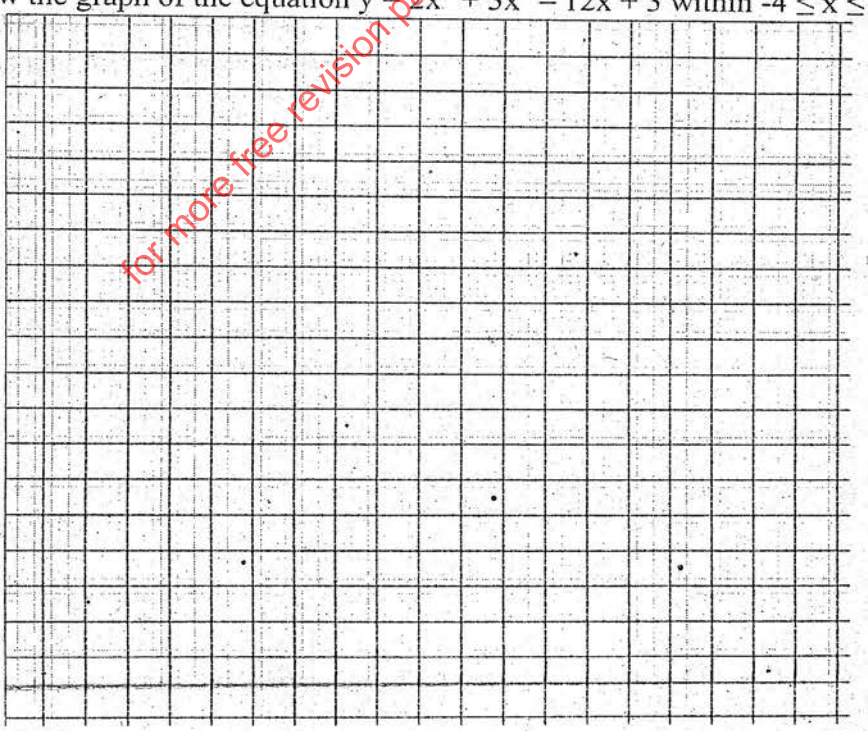
19. a) Construct triangle ABC in which the base BC = 5cm, AC = 4cm, and angle ABC = 30^0. Measure AB (3 mks)

b) Find the difference in area of the two possible triangles. (give the answer to one sf) (3 mks)

c) Construct triangle ACD equal in area to the bigger triangle ABC such that D is on BC produced. Measure AD, (3 mks)

d) Mark the Orthocentre of triangle ACD (1 mk)

20. a) Draw the graph of the equation $y = 2x^3 + 3x^2 - 12x + 3$ within $-4 \leq x \leq 2$ (5 mks)



b) Use the graph to estimate the

i) Roots of the equation $2x^3 + 3x^2 - 12x + 3 = 0$ (1 mk)

ii) Average gradient between x = 0 and x = 2 (2 mks)

iii) The gradient at the point where x = -1 (2 mks)

21. A police post P is 1820m from a school S on a bearing of 192^0. Village Y is 1650 from the police post on a bearing of 162^0. Village Z is 1300m from the police post on a bearing of 286^0. Using a scale of 1cm to represent 200m,

a) Make a scale drawing to show the positions of P,S,Y and Z (6 mks)

b) Find the distance and the bearing of Y from Z (2 mks)

c) Find the distance and the bearing of village S from Z (2 mks)

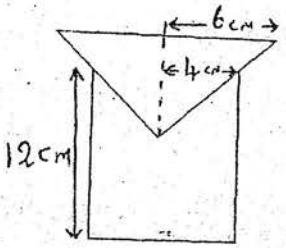
22. Muindi bought 6 cows and 15goats at an auction and spent a total of shs. 97500. His friend Mueni bought on1 cow less and five goats more than Muindi and spent shs. 5000 less.

a) If both bought each animal at the same price, determine the price of each animal at the auction (4 mks)

b) Muindi sold all his animals at a profit of 40% per cow and 50% per goat while Mueni sold all his animals at a profit of 50% per cow and 40% per goat. Determine who made more profit and by how much (4 mks)

c) The cost of a goat was decreased in the ratio 2: 3. Find the loss made by Mueni in buying and selling goats only (2 mks)

23. A right circular cylinder of height 12cm and radius 4cm is filled with water. A heavy circular cone of height 9cm and base radius 6cm is lowered, with vertex downwards and axis vertical into the cylinder until the cone rests on the rim of cylinder as shown below



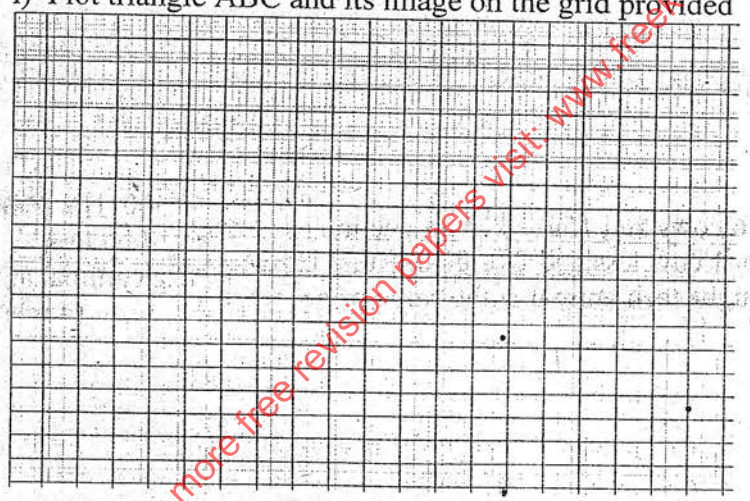
Find

a) The volume of water which spills over from the cylinder (6 mks)

b) The height of water in the cylinder after the spillage (4 mks)

24. The triangle A(-5, 0), B (0, -3), C(0, 3) is reflected on line $x = 0$

a) i) Plot triangle ABC and its image on the grid provided (2 mks)



ii) What is the name of the plane figure formed in (i) above? (1 mk)

b) The figure in (ii) above is translated through (3). Draw the solid formed (4)

i) Calculate the surface area of the solid formed (4 mks)

ii) Calculate the volume of the solid (3 mks)