KENYA HIGH SCHOOL MOCK 2020

MATHEMATICS PAPER 1

Answer all the questions in this section

1. use logarithms to evaluate

$$\frac{2.072841^2}{\sqrt[3]{0.05195}}$$

(4 marks)

2. Given that $\dfrac{x}{x + 2y} = \dfrac{3}{8}$, Find the ratio $x : y$

(2 marks)

3. A two digit number is such that its value equals four times the sum of its digits. If 27 is added to the number, the result is equal to the value of the number obtained when the digit are reversed. What is the number

(3 marks)

4. Solve $4 < 3x -2 < 9+x$ Hence list down the integral value that satisfy the inequalities (3 marks)

5. In the figure below PQRS is a rectangle in which PS= 10cm and PQ = 6cm. M and N are midpoints of QT and RS respectively. Find the area of the shaded part

(4 marks)
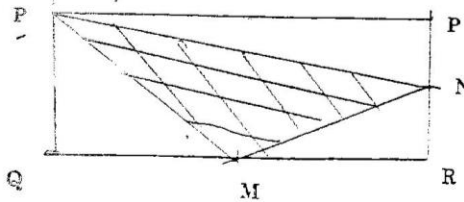
6. Triangle ABC is such that AB =5cm, BC= 4.5 cm and CA = 2.6cm. Find a point P equidistant from CA and CB and which is 4 cm from B

(3 marks)

7. A chord PQ of a circle is 12cm long .it is produced to meet a tangent 8cm long at point T. Calculate the length of PT (3 marks)

8. (a) Factorize completely $2x^2 - 8$ (1 mark)

   (b) Hence simplify
   $$\frac{4x^2 + 2x - 12}{2x^2 - 8} + \frac{1}{x-2}$$
   (3 marks)

9. Use reciprocal and cube tables only to evaluate. Give your answer to 4 significant figures (3 marks)
   $$\frac{1}{0.0375} - \frac{1}{(37.5)^3}$$

10. Differentiate with respect to x
    $$y = \frac{x^3 - 3x^2 - 10x}{x + 2}$$
    (3 marks)

11. Point A'(4,5) is an image of A under a rotation about point(2,3) through 180°.Determine the coordinates of point A (2 marks)

12. Two perpendicular lines intersect at (0,2) If one of them passes through (1,4) find the equations of the two lines (3 marks)

13. Njeri and Kamau live 150km apart Njeri starts from her home at 7.00am and drives towards Kamau's house at 80km/h. Kamau sets from his home at 7.30am and drives at 100km/h toward's Njeri's home. At what time do they meet (3 marks)

14. The volume of two similar cans are 625cm³ and 1080cm³ respectively. If the base of the smaller can is 76cm², Find the base area of the bigger one   (3 marks)

15. The exterior angle of an irregular pentagon and x $(x+10)^0$,$(x-10)^0$$(2x-90)^0$and $(2x-40)^0$
Determine the value of X   (3 marks)

16. The histogram represents the distribution of marks obtained in a test
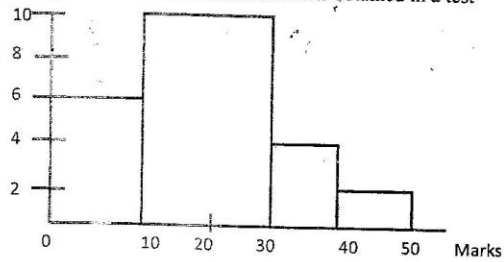
If the frequency of the class representing bar C is 8,determine the number of students who took the test   (4 marks)

SECTION II
**Answer any five questions from this section**
17,A straight line passes through the points(8,-2) and (4,-4)

(a)Write its equation in the form ax + by + c =0 where a, b and c are integers   (3 marks)

(b)   If the line in (a) above cuts the X-axis at point P, determine the coordinates of p   (2 marks)

(c)   Another line which is perpendicular to the line in(a) above passes through point P and cuts the Y axis at point Q, determine the coordinates of point Q   (3 marks)

(d)   Find the coordinates of the midpoint of the line PQ   (2 marks)

18. The figure below shows a tumbler with diameters 6cm and 10cm and height 15cm
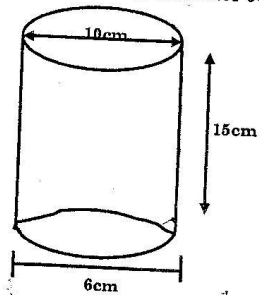
(a) If it is filled with water, what area is in contact with water

(7 marks)

(b) Find the volume of the tumbler

(3 marks)

19. The figure below shows two intersecting circle centre P and Q are of radius 8cm and 10cm respectively. Given that AB = 12cm, angle APB = 97.18⁰ and angle AQB = 73.74⁰
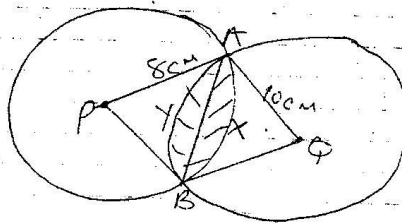
Calculate to four significant figures
(a) The area of the sector PAXB

(2 marks)

(b) The area of the triangle PAB

(2 marks)

(c) The area of the sector QAYB

(2 marks)

(d)   The area of triangle QAP   (2 marks)

(e)   Area of the shaded region   (2 marks)

20.   A tank can be filled by pipe A in 5 hours, pipe B takes 7 hours to fill the same tank. Pipe C
       takes 10 hours to empty the tank
       (i)   If all the pipes are left running simultaneously find how long they will take to fill the
              tank   (5 marks)

       (ii)   Starting with an empty tank, pipes A and C are left running for 6 hours while pipe B is
              closed. How long does it take pipe B to fill the remaining part of the tank   (5 marks)

21.   A room is to be constructed such that its external length and breadth are 7.5 m and 5.3 m
       respectively. The thickness of the wall is 15cm and its height is 3.3M,a total space of 5m³ is to
       be leftout in the walls for doors and windows
       (a)   Calculate the volume of the material needed to construct the walls without the door and
              windows   (4 marks)

       (b)   The blocks ι   d in constructing the walls are 45cmx20cm x 15cm while 0.22m³ of
              cement mi·   ə is used to join the blocks ,calculate

       (i)   The volume of each block   (2 marks)

       (ii)   The number of blocks needed to construct the room   (4 marks)

22.   OPR is a triangle such that OP = P and OR = R,Q is a point on OP produced such that
       OP:PQ =1:1 Y is on RQ such that OY cuts PR at X.PX:XR is 1:3
       (a)   Express OX ,OQ and QR in terms of P and r   (4 marks)

(b) Given that OY =HOX and QY=KQR where K and h are scalar express OY in terms of P and R only

(6 marks)

23. The displacement S metres of a moving particle from a point O after t seconds is given by
$S = t^3 - 5t^2 + 3t + 10$

(a) Find S when t = 2

(2 marks)

(b) Determine
(i) The Velocity of the particle when t = 5 second

(3 marks)

(ii) The value of t when the particle is momentarily at rest

(3 marks)

(c) Find the time when the velocity of the particle is maximum

(2 marks

24. On the grid provided plot the point P (2,2) Q(2,5) and R (4,4)

(a) Join them to form a triangle PQR

(1 mark)

(b) Reflect the triangle PQR in the line x=0 and label the image as $P^1Q^1R^1$ (2 mark)

(c) Triangle PQR is given a translation by vector $T\begin{pmatrix} 2 \\ 2 \end{pmatrix}$ to P'' Q'' R'' plot the triangle P''Q'' R''

(3 marks)

(d) Rotate triangle PQR about the origin through (-90) .State the co-ordinates of P''' Q''' R'''

(3 marks)

(e) Identify two pair of triangle that are directly congruent   (1 mark)