

# KENYA HIGH SCHOOL

## MOCK 2019

### MATHEMATICS PAPER 1

INSTRUCTIONS TO STUDENTS

1. This paper consist of two sections I and II
2. Answer all questions in section I and any five in section ii
3. All the working must be shown after every question
4. Non –programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise

FOR EXAMINER'S USE ONLY

Section I

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

Section II

Question	17	18	19	20	21	22	23	24	Total
Marks									

**GRAND TOTAL**

Answer all the questions in this section

1. Use logarithms to evaluate

$$\frac{(0.07284)^2}{8\sqrt{0.05195}}$$

(4 marks)

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

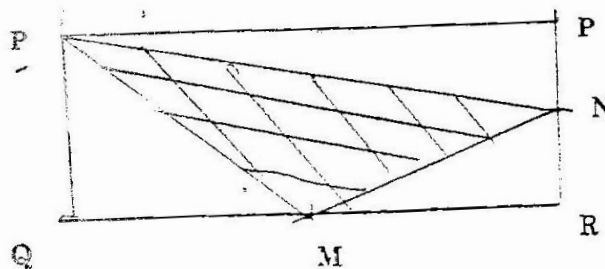
(2 marks)

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 digits 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 QR 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  

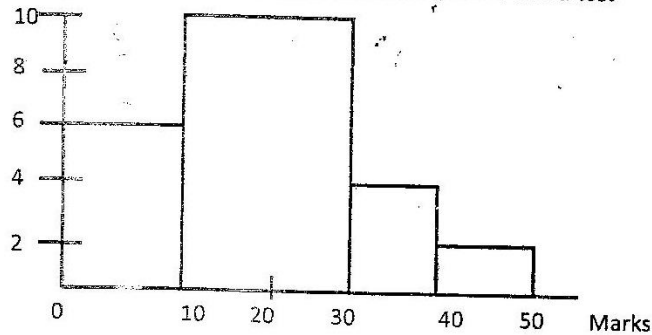
$$\frac{1}{0.0375} - \frac{1}{(37.5)^3}$$
 ( 3 marks)
10. Differentiate with respect to x  

$$y = \frac{x^3 - 3x^2 - 10x}{x + 2}$$
 ( 3 marks)
11. Point A'(4,5) is an image of A under a rotation about point(2,3) through  $180^\circ$ . 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  $625\text{cm}^3$  and  $1080\text{cm}^3$  respectively. If the base of the smaller can is  $76\text{cm}^2$ , Find the base area of the bigger one (3 marks)

15. The exterior angle of an irregular pentagon are  $x$ ,  $(x+10)^\circ$ ,  $(x-10)^\circ$ ,  $(2x-90)^\circ$  and  $(2x-40)^\circ$ . 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)

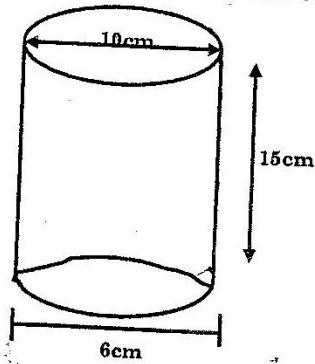
## SECTION II

Answer any five questions from this section

17. A straight line passes through the points  $(8, -2)$  and  $(4, -4)$

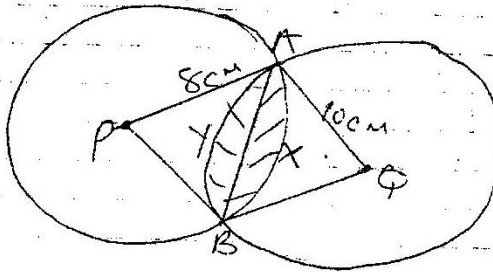
- (a) Write its equation in the form  $ax + by + c = 0$  where  $a$ ,  $b$  and  $c$  are integers (3 marks)
- (b) If the line in (a) above cuts the X-axis at point P, determine the coordinates of P (2 marks)
- (c) Another line which is perpendicular to the line in (a) above passes through point P and 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 circles centre P and Q are of radius 8cm and 10cm respectively. Given that  $AB = 12\text{cm}$ , angle  $APB = 97.18^\circ$  and angle  $AQB = 73.74^\circ$



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  $5\text{m}^3$  is to be left out 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 used in constructing the walls are  $45\text{cm} \times 20\text{cm} \times 15\text{cm}$  while  $0.22\text{m}^3$  of cement mixture 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  $OQ = kOR$  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  $T \begin{Bmatrix} 2 \\ 2 \end{Bmatrix}$  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