

GATITU SECONDARY SCHOOL P.O BOX 327 01030 GATUNDU

MATHEMATICS FORM 4 MID-TERM EXAM 2015 TR 1

TIME 2HRS



NAME \_\_\_\_\_ ADM \_\_\_\_\_

1 Find the Centre and the radius of each of the following circles;

(a)  $X^2 + Y^2 + 10X + 18Y - 38 = 0$

(3mks)

(b)  $X^2 + Y^2 - 16X + 24Y + 127 = 0$

(4MKS)

(II) Line AB is the diameter of a circle. Find the equation of the circle given the co-ordinates of A and B as A (-1, -4), B (7, 2)

(4mks)

2 Machine A can complete a piece of work in 6 hours while machine B can complete the same work in 10 hours.

(a) If the two machines are working together , how long will it take to complete the work?  
(3mks)

(b) If both machines start working together and machine A breaks down after 2 hours ,how long will it take machine B to complete the rest of the work?  
(3mks)

3 The probability that horse A wins a race against B is  $\frac{2}{3}$ . If the horses run 3 races in succession ,

(i) Draw a tree diagram to represent the above information (2mks)

(ii) Find the probability that

(a) Horse B wins all the races

(2mks)

(b) Horse A wins only 1 race

(2mks)

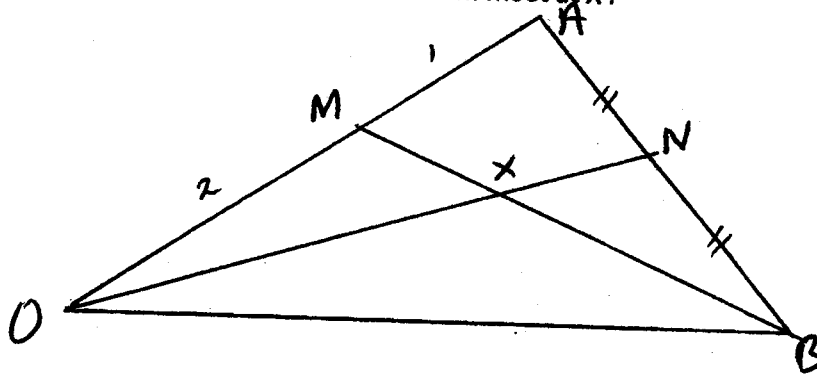
(c) Horse A wins at least 1 race

(2mks)

(d) Horse B wins more races than horse A

(2mks)

4 The diagram below shows triangle  $OAB$  in which  $N$  is the mid-point of  $AB$  and  $M$  is a point on  $OA$  such that  $OM : MA = 2 : 1$ . Lines  $ON$  and  $BM$  meet at  $X$ .



Given that  $OA = a$  and  $OB = b$  and also that  $OX = h ON$  and  $MX = k MB$ .

(a) Express in terms of  $\mathbf{a}$  and  $\mathbf{b}$  vectors

AB

(1mk)

ON

(2mks)

BM

(1mk)

(b) By expressing OX in two different ways, determine the values of  $h$  and  $k$ .

(6mks)

5 The table below shows the rate of taxation in a certain year.

Income in K£ p.a	Rate of taxation in sh per K£
1-----3,900	2
3,901-----7,800	3
7,801-----11,700	4
11,701-----15,600	5
15,601-----19,500	7
Above 19,500	9

In that period Juma was earning a basic salary of ksh 21,000 per month. In addition he was entitled to a house allowance of ksh 9,000 p.m and a personal relief of ksh 1,056 pm.

(a) Calculate how much income tax Juma paid per month.

(7mks)



6 Two quantities are thought to be related by a law of the form  $Y = ax^n$  where  $a$  and  $n$  are constants. Some experimental values of  $x$  and  $y$  are shown below

X	1	1.5	2.0	2.5	3.0	3.5
Y	3.1	15.0	50.0	122.0	254.0	447.0

Use a suitable graph to estimate the values of  $a$  and  $n$

(10mks)

7 The 2<sup>nd</sup>, 4<sup>th</sup> and 7<sup>th</sup> terms of an A.P are the first 3 consecutive terms of a G.P. Find

(a) The common ratio  $d = 2$

(3mks)

(c) The sum of the first eight terms of the G.P if the common difference of the A.P is 2  
(3mks)

