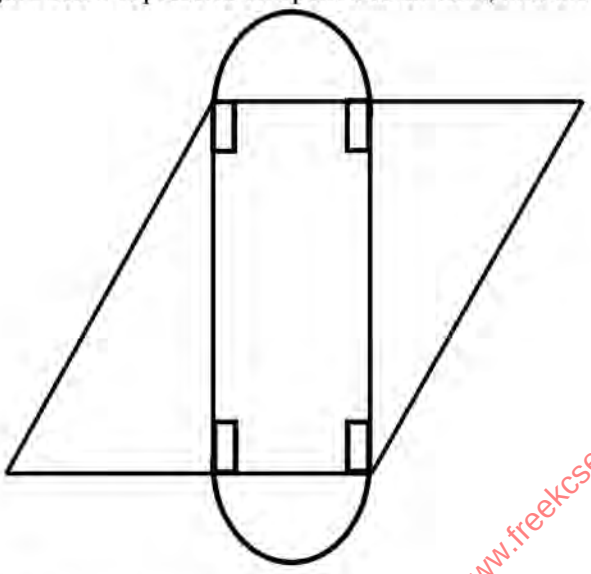
MAKUENI COUNTY CLUSTER PREPARATORY EXAMINATION 2016
Kenya Certificate of Secondary Education (K.C.S.E)
MATHEMATICS
Paper 1
July/August 2016
Time : 2 ½ Hours

1. Without using calculators evaluate, (3 marks)
$$\frac{-2(5+4)-8\div 2+7}{-3x-6+2x-4}$$
2. Use tables of reciprocals to work out
$$\frac{3}{0.6785}+\frac{12}{0.156}$$ (3 marks)
3. Two containers have base area of 120cm^{2}and 750 cm^2 respectively. Calculate the volume of the larger container in litres given the volume of the smaller container is 400cm^3. (3 marks)
4. Two straight lines are perpendicular to each other at point M. One of the lines passes through (2, 6) and the equation of the other line is $2y + 3x - 5 = 0$. Calculate the co-ordinates of M. (4 Marks)
5. The figure below represents an opened collar cloth, find the distance around it. (Take $\pi = \frac{22}{7}$) (3 marks)



6. Solve for x in the given equation. (3 marks)
$64x - 121 = 7 - 4^{3x}$
7. (a) On line MN below construct angle of 45^0 at point M using a ruler and a pair of compasses only. (1 mark)

(b) Hence mark a point A on MN such that MA: AN = 2:4 (3 marks)
8. A Kenyan company received US dollars 100,000. The money was converted into Kenya shillings in bank which buys and sells foreign currency as follows.

	Buying (in Kenya shillings)	Selling (in Kenya shillings)
1 US dollar	77.24	77.44
1 Sterling pound	121.93	122.24

(a) Calculate the amount of money in Kenya shillings the company received (2 marks)
(b) The company exchanged the Kenya shillings calculated in (a) above into sterling pounds to buy a car from Britain. Calculate the cost of the car to the nearest sterling pound. (2 marks)
9. Simplify the expression (3 marks)
$$\frac{4x-25x^3}{10x^2+19x+6}$$
10. The sum of angles of a triangle is given by the expression $(2a + b)^0$ while that of a quadrilateral is given by $(13a - b)^0$. Calculate the values of a and b (4 marks)
11. Solve the following inequality and show your solution on a number line. (3 marks)
$4x - 3 \leq \frac{1}{2}(x + 8) < x + 5$

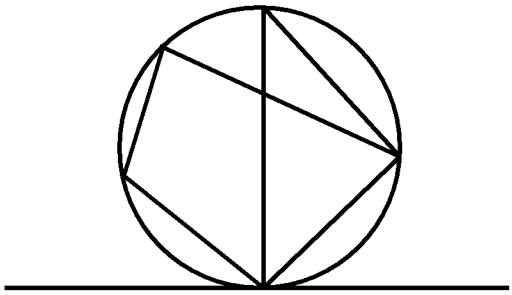
for more past papers visit: www.freekcsepastpapers.com or call 0720502479

12. Solve for θ in the equation
Sin $(2\theta - 10) = -0.5$ for $0^0 \leq \theta \leq 360^0$ (3 marks)

13. A rostrum whose vertical height is 4cm is formed by cutting the top of a cone parallel to the base if the two radii of the frustrum are 6cm and 8cm respectively, determine the height of the original cone. (3 marks)

14. An alloy is made of aluminium, zinc and copper in the ratio 3 : 2 : 5 by mass. Find the mass of aluminium in a piece of alloy which contains 5.75 kg of copper. (2 marks)

15. In the circle below, ABCD is a cyclic quadrilateral angle ABC = 70^0, Angle BCF = 40^0 and angle CED = 35^0 if FCG is tangent to circle at C



Calculate
(i) $\angle GCD$ (1 mark)
(ii) $\angle BCD$ (1 mark)
(iii) $\angle BAD$ (1 mark)

16. The table below shows marks scored by 40 students in a mathematics test.

M arks	30-39	40-49	50-59	60-69	70-79
No of students	2	10	13	8	7

Calculate the median mark (3 marks)

SECTION II: 50 MARKS
(Answer any five questions)

17. Jane is a Sales executive earning a salary of KSh. 20,000 and a commission of 8% for the sales in excess of KSh. 100,000. If in January 2010 she earned a total of KSh. 48,000 in salaries and commissions.
(a) Determine the amount of sales she made in that month (4 marks)
(b) If the total sales in the month of February and March increased by 18% and then dropped by 25% respectively. Calculate
(i) Jane's commission in the month of February (3 marks)
(ii) her total earning in the month of March (3 marks)

18. (a) Fill in the table below for the function $y = 6 + x - x^2$

x	-4	-3	-2	-1	0	1	2	3	4	5
y		-6			6			0		-14

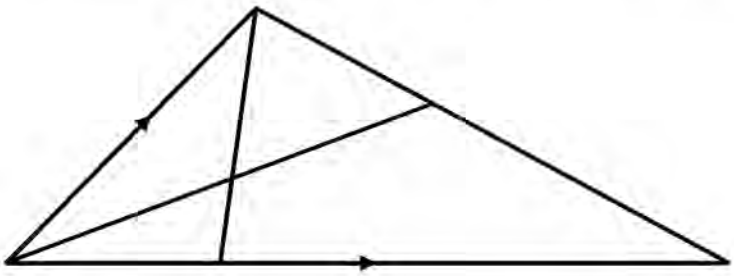
(b) Using the completed table values, draw graph of $y = 6 + x - x^2$ taking integral values of x in $-4 \leq x \leq 5$ (3 marks)
(c) Using the same axes draw the graph of $y = 2 - 2x$ (2 marks)
(d) From your graph, find the values of x which satisfy the simultaneous equations $y = 6 + x - x^2$ and $y - 2x$ (1 mark)
(e) Write down and simplify a quadratic equation which is satisfied by the values of x where the two graphs intersect. (2 marks)

19. A lorry left town A for town B at 6.50 p.m at an average speed of 60km/hr. After 1 hr 45 mins a car left two A for B at an average speed of 90km/hr. If A is 317 from B. Determine
(a) the distance of the lorry from town B when the car took off (3 marks)
(b) The distance the car travelled to catch up with the lorry (4 marks)
(c) What time of the day did the car catch up with the lorry? Give your answer in 24 hr system (3 marks)

20. Four towns P, Q, R and S are such that town Q is 150km on a bearing of 070^0 from town P. Town R is 200km on a bearing of 160^0 from town Q. Town S is due west of town R and 135km due south of town P.
(a) Draw a sketch diagram showing the positions of towns P, Q, R and S. (1 mark)
(b) Without using scale drawing calculate
(i) the distance PR (3 marks)
(ii) to 2 s.f the bearing of P from R (3 marks)
(c) Calculate to the nearest whole number the distance RS (3 marks)

for more past papers visit www.freekcsepastpapers.com or call 0720502479

21. In the diagram below $\overrightarrow{OA}$ = a and OB = b. The point P and Q are such that AP = $\frac{2}{3}AB$ and OQ = $\frac{1}{3}OA$



(a) Express AB,OP and BQ in terms of a and b (3 marks)
(b) If $\overrightarrow{OC}$ = hOP and BC = kBQ. Express OC in two different ways and hence deduce
(i) the values of h and k (5 marks)
(ii) the vector OC in terms of a and b only (1 mark)
(iii) the ratio in which C divides BQ (1 mark)

22. Using a ruler and pair of compasses only for all the construction in this question. A plot of land ABCD is a parallelogram shaped such that AB = 800m, AD = 600m and angle BAD = 105^0.
(a) Construct this plot of land using the scale 1cm : 100m
(b) Bisect angle ADC
(c) Drop a perpendicular from A to DC
(d) Locate a point H, which is equidistant from AD and DC and lies on the perpendicular from A to DC.
(e) Find the shortest distance from the house (H) to DC

23. Mwangi bought 2 cows and 6 goats for a total of KSh. 99200. If he had bought 3 cows and 4 goats he would have spend 3000 less.
(a) Form two equations to represent the above information. (2 marks)
(b) Use matrix method to determine the cost of a cow and that of a goat (4 marks)
(c) The businessman later sold the animals he had bought making a profit of 40% per cow and 30% per goat.
(i) Calculate the total amount of money he received (2 marks)
(ii) Determine, correct to 3 significant figures, the percentage profit the businessman made from the sale of animals. (2 marks)

24. The acceleration of a body moving along a straight line is $(-t + 4)$ m/s^2 and its velocity is v m/s after t seconds.
(a) (i) Express the velocity v in terms of t if the initial velocity of the body us 4 m/s (3 marks)
(ii) Find the velocity of the body after 3 seconds (2 marks)
(b) Calculate
(i) the time taken to attain maximum velocity (2 marks)
(ii) the distance covered by the body to attain the maximum velocity (3 marks)

for more past papers visit www.freekcsepastpapers.com or call 0720502479