

NAME.....

INDEX NO.....

SCHOOL.....

CANDIDATE'S SIGN.....

DATE.....

121/1

MATHEMATICS

FORM 4

MARCH/APRIL 2013

TIME: 2 1/2 HOURS

ELDOR ET EAST INTER - SCHOOLS TEST (EIST) - 2013

(Kenya Certificate of Secondary Education)

Instructions to Candidates

1. Write your name, class and admission number in the space provided at the top of this page.
2. This paper has two sections: Section I and Section II.
3. Answer all questions in Section I and any five questions in section II.
4. All answers and working must be written on the question paper in the space provided below each question.
5. Marks may be awarded for correct working even if the answer is wrong.
6. Non-programmable silent electronic calculators and KNEC Mathematical Tables may be used except where stated otherwise.

FOR EXAMINERS USE ONLY

Section I

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

Section II

17	18	19	20	21	22	23	24	Total

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SECTION A**Answer all questions in this section**

1. Given that $\frac{\frac{3}{5} \text{ of } 60 - 2\frac{2}{3} \times 1\frac{1}{2}}{5\frac{5}{8} \times 1\frac{7}{9} - \frac{5}{4} \text{ of } 4\frac{4}{5} + 2\frac{4}{5} \div \frac{7}{10}} = M^m$

Find the value of M

(3marks)

2. Find the range of values that satisfy the inequality.

(2marks)

$$x - 4 \leq 3x + 2 < 2(x + 5)$$

3. Determine the value of x for which the matrix below is a singular.

(3marks)

$$\begin{pmatrix} x & 4 \\ 1 & x-3 \end{pmatrix}$$

4. Solve the simultaneous equation.

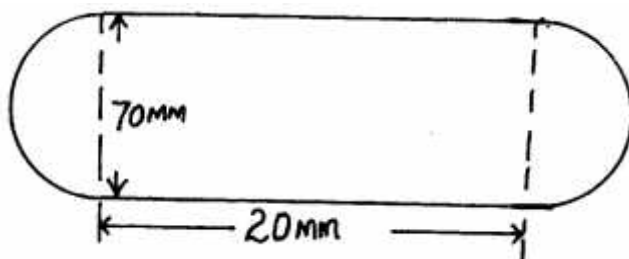
$$2x - y = 3$$

$$x^2 - xy = -4$$

(3marks)

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5. The figure below (not drawn to scale) shows the cross-section of a metal bar of length 3 metres. They are equal semi-circles.



Determine the mass of the metal bar in kilograms if the density of the metal is 8.87 g/cm^3 . (3marks)

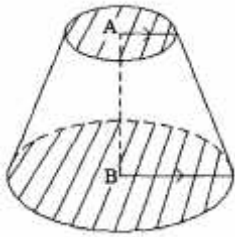
6. The equation of a line is $-\frac{3}{5}x + 3y = 6$. Find;

a) The gradient of the line.

(1mark)

b) The equation of a line passing through the point (1, 2) and perpendicular to the given line. (2marks)

7. The figure below show a solid conical frustum with top and bottom parallel circular planes of $9\pi \text{ cm}^2$ and $16\pi \text{ cm}^2$ respectively. If the volume of the cone from which the frustum was cut off is 320 cm^3 , calculate the volume of the frustum. (4marks)



8. The position vectors of points x, y and z are $\vec{X} = t\vec{i} + 2\vec{j}$, $\vec{Y} = 2\vec{i} + 3\vec{j}$, and $\vec{Z} = 3\vec{i} + 4\vec{j}$ respectively. If the points x, y and z are collinear, find the value of t. (3marks)

9. If $T = \frac{n}{P^3 + nr}$, make P the subject of the formula. (3marks)

10. Two flag posts 4.7m and 6.5m in height stand a distance of 8.1m apart, and a straight rope joins their tops.

Find:

a) The length of the rope. (3marks)

b) The angle of depression of the rope. (1mark)

11. Kipyego bought a Television set and marked it at Sh. 32,500. He later sold the TV set at 10% discount and still made a profit of 30%. Calculate the price at which Kipyego sold the T.V set. (3marks)

12. Find the values of θ which satisfy the trigonometric equation.

$$2\sin^2\theta - 5\cos\theta + 1 = 0 \text{ for } 0^\circ \leq \theta < 360^\circ$$

(3marks)

13. The L.C.M of three numbers is 7920 and their G.C.D is 12. Two of the numbers are 48 and 264. Using factor notation find the third number if one of its factors is 9. (3mark)

14. Two similar cans have different heights 8cm and the other one 10cm. if the surface area of the larger can is 480cm^2 , find the surface area of the smaller can. (3marks)

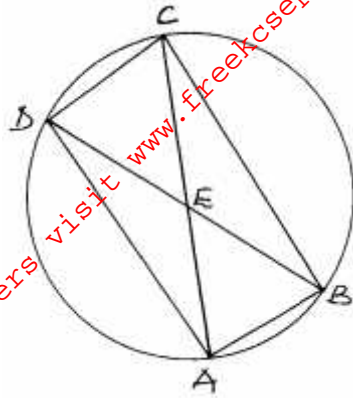
15. Two types of coffee are available in a shop. Grade A cost Sh. 150 per kilogram and grade B cost Sh. 160 per kilogram. If Grade A and B are mixed in the ratio $2: x$, find x such that the selling price will give a 25% profit if the mixture is sold at Sh. 1950 for 10kg. (3marks)

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16. A tank is supplied by two pipes. The larger pipe can fill the tank in 10 minutes less than the smaller pipe. Running the two pipes together fill the tank in 12 minutes. Find the time taken by each pipe separately to fill the tank. (4marks)

SECTION B
Answer ANY five questions

17. In the figure below ABCD is a cyclic quadrilateral and that angle $ABD = 42^\circ$, $BAC = 58^\circ$ and $DBC = 36^\circ$.



Giving reasons find the values of;
a) Angle DAC.

(2marks)

b) Angle ADB.

(2marks)

c) Angle ACB.

(2marks)

d) Angle CDB.

(2marks)

e) Angle CEB.

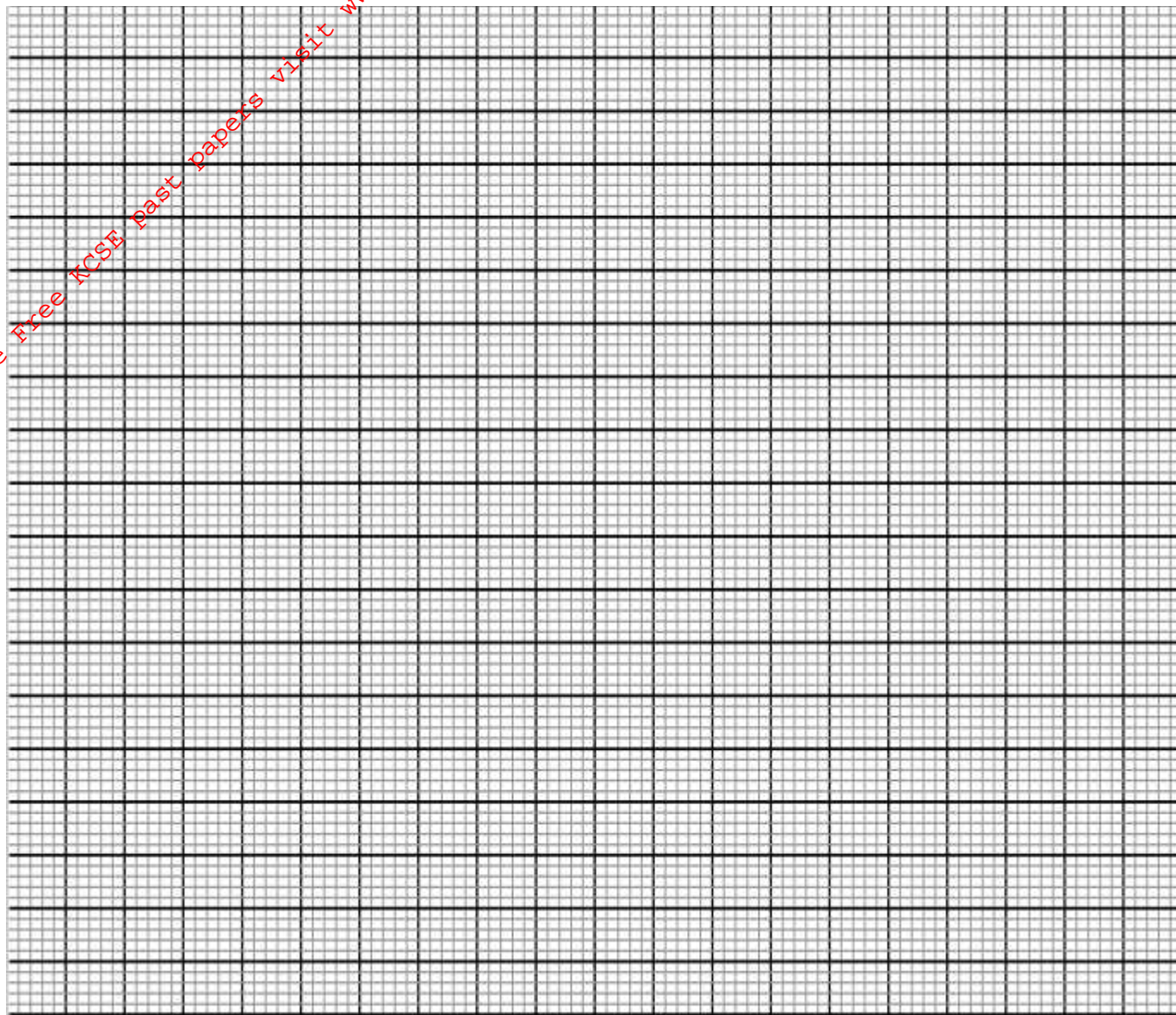
(2marks)

18. Using the same axes a horizontal scale of 1cm to represent 30° and vertical scale of 4cm represent 1 unit.

a) Fill in the table. (2marks)

x	0	30	60	90	120	150	180	210	240	270	300	330	360
Sin (x - 15)	-2.59		0.707					-0.259		-0.966			
2Cos x				0.00		-1.732						1.732	2.00

Draw the graph of $y = \text{Sin}(x - 15)$ and $y = 2\text{Cos } x$ on the graph paper provided, (5marks)



b) Use your graphs, solve the equations:

i) $\text{Sin}(x - 15) = 0.5$ (1mark)

ii) $\text{Sin}(x - 15) = 2\text{Cos } x$. (2marks)

19. A pirate boat sailed from port A on a bearing of 050° at a speed of 112km/h , for $2\frac{1}{2}$ hours to port B. From B it changes its course and traveled on bearing of 170° at a speed of 75km/h for $2\frac{2}{3}$ hours towards port C. From C it traveled to port D. D is on a bearing of 130° and 160km from A.

- a) Using a scale of 1cm to represent 40km , draw a diagram showing the positions of the ports A, B, C and D. (5marks)

b) Use your diagram to find;

i) The distance of C from D. (1mark)

ii) The bearing of C from D. (1mark)

c) A marine police post leaves port A to intercept the pirate boat at M as it moves from B to C in the shortest time possible.

i) How far from port A will the two boats meet at M? (2marks)

ii) If the boats meet after 2 hours, what is the speed of the marine police boat? (1mark)

20. The table below represents marks scored in maths:

Marks	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79
No. of students	2	6	7	13	6	4	2

Use the above frequency table to calculate:

i) Mean (3marks)

ii) Standard deviation. (4marks)

iii) Upper quartile. (3marks)

21. The cash price of a tractor is Ksh. 1.8million. The tractor can also be bough through a bank loan. The customer is supposed to raise a down payment of 20% of the cash price. The balance is paid through the loan at 10% compound interest. Simba bought the tractor through the loan.

a) i) Calculate the amount of money he borrowed. (3marks)

ii) Simba paid the loan in 4 years. Calculate the total amount he paid for t he tractor. (3marks)

b) Find how long he would take to repay the loan if he paid a total of Sh. 2,276,640. (4marks)

22. a) A factory manufactures 100,000 sweets in the first hour. The rate of production decreases by 20% every hour.

i) Calculate the number of sweets produced in the 4th hour. (3marks)

ii) Calculate the total number of sweets produced in the first 5 hours. (3marks)

b) The eleventh term of an Arithmetic progression is four times the second term. The sum of the first seven terms of the same progression is 175. Find;

i) The first term. (3marks)

ii) The common difference. (1mark)

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23. The probability that a pupil goes to school by a boda-boda is $\frac{2}{3}$ and by a matatu is $\frac{1}{4}$ if he uses a boda-boda the probability that he is late is $\frac{2}{5}$ and if he uses matatu the probability of being late is $\frac{3}{10}$. If he uses other means of transport the probability of being late is $\frac{3}{20}$.

a) Draw a tree diagram to represent this information. (3marks)

b) Find the probability that he will be late for school. (3marks)

c) Find the probability that he will be late for school if he does not use a matatu. (2marks)

d) What is the probability that he will not be late to school? (2marks)

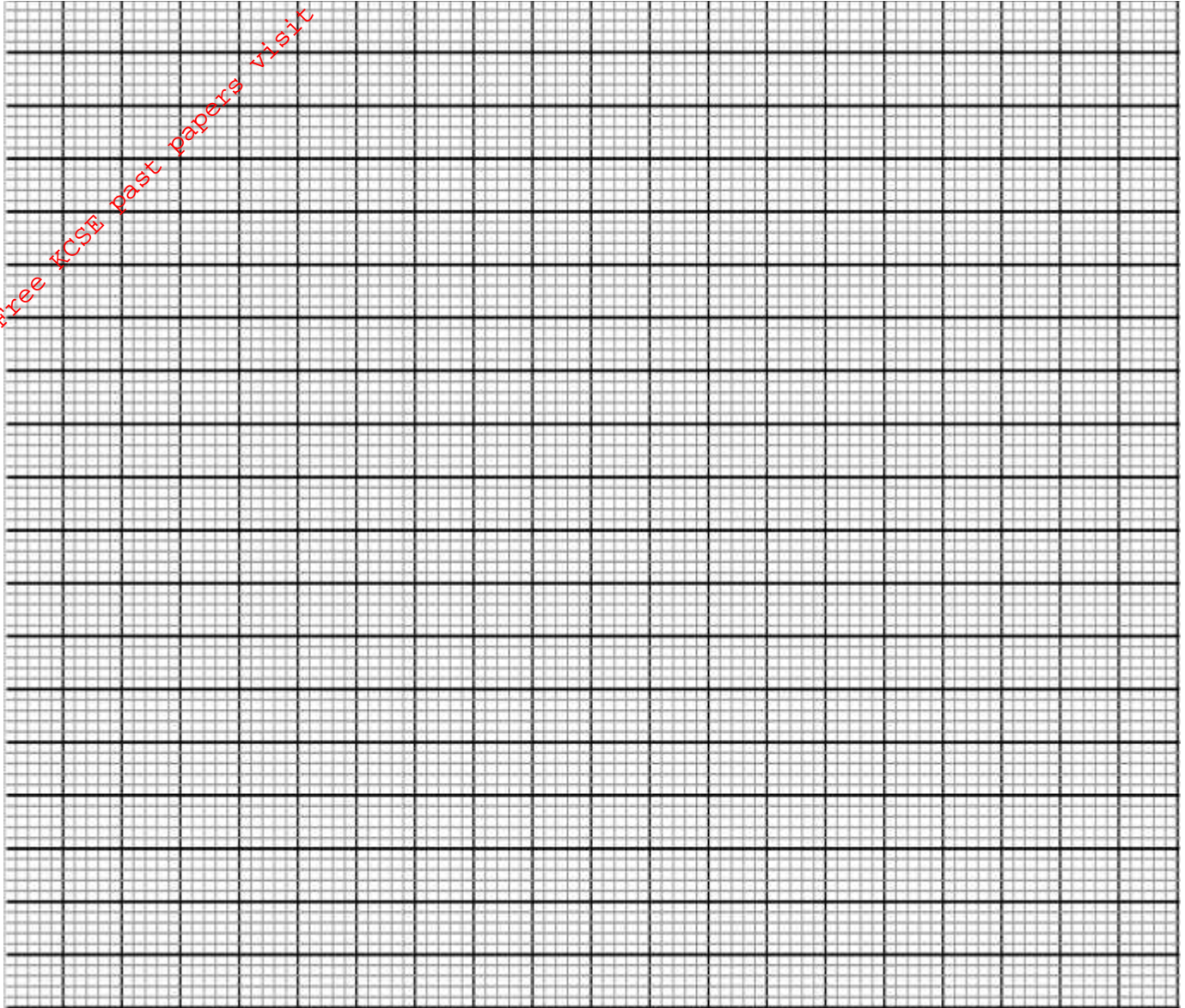
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24. The table below shows the values of x and some values of y for the curve $y = x^3 + 3x^2 - 4x - 12$ in the range $-4 \leq x \leq 2$.

a) Complete the table by filling in the missing values of y . (2marks)

X	-4	-3.5	-3	-2.5	-2.0	-1.5	-1.0	-0.5	0	0.5	1.0	1.5	2.0
Y		-4.1		1.1		-2.6		-9.4		-13.1		-7.9	

b) On the grid provided draw the graph of $y = x^3 + 3x^2 - 4x - 12$ in the range. $-4 \leq x \leq 2$ (4marks)



c) By drawing a suitable straight line on the same grid solve the equation $x^3 + 3x^2 - 5x - 6 = 0$.

(4marks)

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