

NAME..... ADM NO..... CLASS.....

SCHOOL MARINE SCHEME SIGNATURE.....

DATE.....

121
 MATHEMATICS
 OCTOBER/NOVEMBER 2012
 TIME: 2½ HOURS

MURANG'A EAST FORM ONE JOINT EXAMINATION 2012

Kenya Certificate of Secondary Education
 MATHEMATICS
 TIME: 2½ HOURS

INSTRUCTIONS TO CANDIDATE:

- (i) The paper contains two Sections: Section I and II.
- (ii) Answer all the questions in both sections.
- (iii) Workings and answers must be clearly shown.
- (iv) Marks may be awarded even if the answer is wrong.
- (v) Mathematical tables may be used but calculators **MUST NOT** be used.

For examiner's use only

SECTION I

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

SECTION II

17	18	19	20	21	TOTAL

PERCENTAGE MARK

34

SECTION I: (50 MARKS)

Answer all questions in the spaces provided:

1. Find the L.C.M and G.C.D of 24, 36 and 50.

(3 marks)

$$\begin{aligned} 24 &= 2 \times 2 \times 3 \times 2 \\ 36 &= 2 \times 2 \times 3 \times 3 \\ 50 &= 2 \times 5 \times 5 \end{aligned}$$

$$\text{L.C.M} \\ \underline{\underline{2^3 \times 3^2 \times 5^2}}$$

$$\begin{aligned} 24 &= 2^3 \times 3 \\ 36 &= 2^2 \times 3^2 \\ 50 &= 5^2 \times 2 \end{aligned}$$

2. Work out: $\frac{-4 + (-3) \times (-2) - (-3)}{-3 \times -6 + -1 \times 3}$

(3 marks)

Leaving your answer as fraction.

$$\begin{aligned} &\underline{-4 + 6 + 3} \\ &18 + -3 \\ &\underline{9 - 4} \\ &15 \end{aligned} \quad \begin{aligned} &\underline{5} \\ &15 \\ &\underline{\underline{\frac{1}{3}}} \end{aligned}$$

3. Evaluate: $\frac{0.015 + 0.45 \div 1.5}{4.9 \times 0.2 + 0.07}$

(3 marks)

Leaving your answer as a decimal.

$$\begin{aligned} &\underline{0.015 + \frac{45}{100} \div \frac{15}{10}} \\ &0.98 + 0.07 \\ &\underline{+ 0.98} \quad \underline{0.055} \\ &1.05 \quad \underline{+ 0.3} \\ &\quad \underline{0.315} \end{aligned}$$

$$\begin{aligned} &\underline{0.315} \\ &1.05 \\ &\underline{\underline{0.3}} \end{aligned}$$

4. (a) List the first three odd prime numbers in descending order. (1 mark)

3, 5, 7

7, 5, 3

- (b) Express 10500 in terms of its prime factors and index/power joint. (1 mark)

$$10500 = 2 \times 2 \times 5 \times 5 \times 5 \times 3 \times 7$$

$$\underline{10500 = 2^2 \times 3 \times 5^3 \times 7}$$

5. Tom spent $\frac{2}{5}$ of his salary on food and $\frac{3}{8}$ of his salary on paying school fees for his children. If he remained with Khs. 12,300, find the amount he spent on food. (4 marks)

$$f = \frac{2}{5}$$

$$f = \frac{3}{8}$$

$$\frac{2}{5} + \frac{3}{8}$$

$$\frac{16 + 15}{40} = \frac{31}{40}$$

$$\frac{9}{40} = 12300$$

$$\frac{40}{40} = x$$

$$\frac{9}{40} x = 12300$$

$$x = \frac{12300 \times 40}{9}$$

$$\frac{492000}{9}$$

$$\underline{54,666.70 \times \frac{2}{5}}$$

$$\underline{21,866.70}$$

6. It takes 30 workers 6 days working 8 hours a day to harvest maize in a farm. How many days would 50 workers working 6 hours a day take to harvest the maize? (3 marks)

W	D	H
30	6	8
50	6	6

W inc 50:30
days dec

30:50

hrs dec 6:8

days inc 8:6

$$6 \times \frac{30}{50} \times \frac{8}{6}$$

$$\frac{24}{5}$$

$$4.8$$

$$\underline{4 \frac{4}{5} \text{ days}}$$

7. A Kenyan businessman bought goods from Japan worth 5,900,000 Japanese Yen. On arrival in Kenya, a custom duty of 20% was charged on the value of goods. The exchange rates were as follows.

1 US\$ = 118 Japanese Yen
 1 US\$ = 76 Kenya shillings

Calculate the duty in Kenya shillings.

(3 marks)

$$\frac{20}{100} \times 5,900,000$$

$$\frac{1180,000 \text{ J.Y.}}{118}$$

$$10,000 \times 76$$

$$\underline{\underline{\text{Ksh. } 760,000}}$$

8. A shirt whose marked price is Ksh.800 is sold to a customer after allowing him a discount of 13%. If the trader makes a profit of 20%, find how much the trader paid for the shirt.

(3 marks)

M.P Ksh 800

$$D = 13\%$$

$$800 \times \frac{87}{100} = 696$$

$$696 = 120\%$$

$$? = 100$$

$$\frac{696 \times 100}{120}$$

$$\frac{69600}{120}$$

$$\underline{\underline{\text{Ksh } 580}}$$

9. Solve the equation

$$\frac{x-2}{3} - \frac{3-x}{4} = \frac{x-2}{2}$$

(3 marks)

$$4(x-2) - 3(3-x) = 6(x-2)$$

$$4x - 8 - 9 + 3x = 6x - 12$$

$$7x - 17 = 6x - 12$$

$$x = -12 + 17$$

$$\underline{\underline{x = 5}}$$

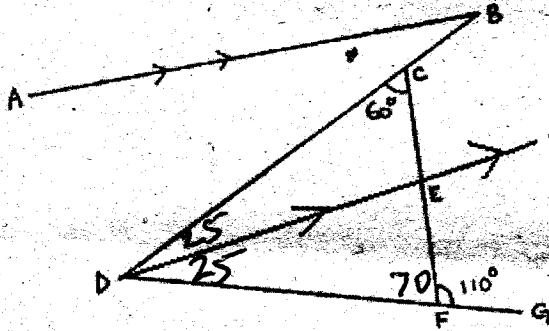
10. If $a = 3$, $b = 4$ and $C = 1.5$, find $\frac{\sqrt{ba^2}}{1.5}$

(3 marks)

$$\frac{\sqrt{4 \times 9}}{1.5} = \frac{\sqrt{36}}{1.5}$$

$$\frac{6}{1.5} = \frac{60}{15}$$

$$\underline{\underline{4}}$$



In the figure above, AB is parallel to DE , DE bisects angle BDG , angle $DCF = 60^\circ$ and angle $CFG = 110^\circ$.

Find: $\angle CDF$

(a) $\angle CDF$

(2 marks)

(b) Angle ABD .

(2 marks)

Give reasons for your answers

$$\angle CDF = 50^\circ$$

$$\underline{\underline{\angle ABD = 25^\circ}}$$

12. To fence a side of her farm, a farmer requires 25 posts placed 4m apart. Calculate the length of the side she intends to fence. Hence determine the number of posts required if they were to be placed 2m apart. (4 marks)

$$\overline{\hspace{2cm}} \quad 25 \times 4$$

$$100M$$

$$\begin{array}{r} 100 \text{ SD} + 1 \\ \hline 2 \quad \text{51P.} \\ \hline \end{array}$$

13. Use Mathematical tables to evaluate:

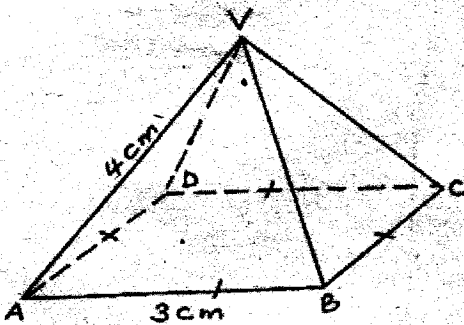
$$2.341^2 + \sqrt{549}$$

(3 marks)

$$\begin{array}{r} 5.480281 \\ + 23.430749 \\ \hline 28.911030 \end{array}$$

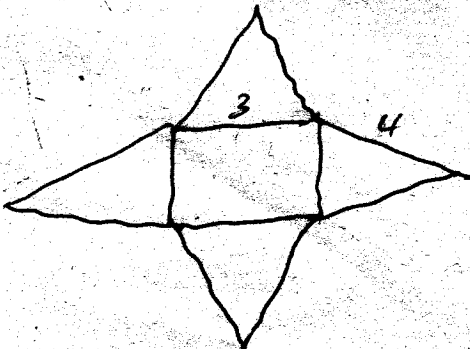
$$\underline{\underline{28.911}}$$

14. The diagram below represents right pyramid on a square base of side 3cm. The slant edge of the pyramid is 4cm.

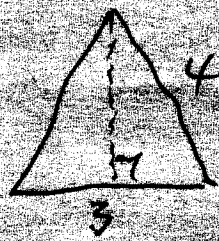


- (a) Draw and label a net of the pyramid.

(2 marks)



- (b) On the net drawn, determine the height of the triangular face from the top of the pyramid give your answer to 2d.p. (2 marks)



$$\sqrt{4^2 - (1.5)^2}$$

$$\sqrt{16 - 2.25}$$

$$\sqrt{13.75}$$

$$= 3.708$$

$$\underline{\underline{3.71}}$$

15. The interior angles of a hexagon are $2x^\circ$, $\frac{1}{2}x^\circ$, $x + 40^\circ$, 110° , 130° and 160° .

Find the value of the smallest angle. (3 marks)

~~$$(2x - 4)90$$~~

~~$$(12 - 4)90 =$$~~

$$8 \times 90 = 720$$

$$2x + \frac{1}{2}x + x + 40 + 110 + 130 = 720$$

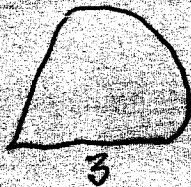
$$3.5x = 720 - 280$$

$$3.5x = 440$$

$$x = 125.71$$

$$\frac{1}{2}x = \underline{\underline{62.85}}$$

16. The area of a sector of a circle of radius 3cm is 22cm^2 . If the sector subtends an angle of θ° at the center of the circle, calculate the value of θ° . (Use π as $\frac{22}{7}$). (2 marks)



$$22 = \frac{\theta}{360} \times \frac{1}{2} \times 3 \times 3 \times 3.142$$

$$22 \times 40 = 3.142 \theta$$

$$\theta = \frac{22 \times 40}{3.142}$$

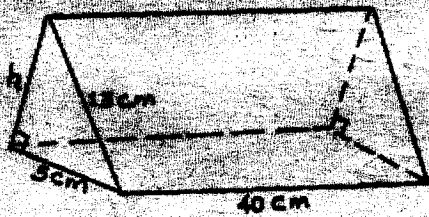
$$\frac{880}{3.142}$$

$$= \underline{\underline{280.08}}$$

SECTION II: (50 MARKS)

Answer all questions in the spaces provided:

17. The figure below shows a solid prism whose cross-section is a right-angled triangle.



- (i) Calculate the length of h.

$$\sqrt{13^2 + 5^2}$$

$$\sqrt{169 + 25}$$

$$\sqrt{194}$$

$$= 13.93 \text{ cm}$$

(1 mark)

- (ii) Determine surface area of the prism.

$$\frac{1}{2} \times 5 \times 13.93 \times 2$$

$$13 \times 40$$

$$5 \times 40$$

$$13.93 \times 40$$

$$67.65$$

$$520.0$$

$$200$$

$$558.2$$

$$1346.85 \text{ cm}^2$$

(4 marks)

- (iii) Calculate the volume of prism in m^3 .

$$67.65 \times 40$$

$$2706 \text{ cm}^3$$

$$67.65 \times 40$$

$$2706 \text{ cm}^3$$

(3 marks)

- (iv) If the density of the material making the prism is 850 kg/m^3 , calculate the mass of the prism.

$$D = \frac{M}{V}$$

(2 marks)

18. A trader bought 5 exercise books and 7 pens at a total cost of Ksh.170 from a shop. At the same day he later decided to buy 13 exercise books and 4 pens at a total cost of Ksh.300.

- (a) Taking the cost of one exercise book as sh.X and that of a pen as sh.y, form two equations in X and y. (1 mark)

$$\begin{aligned} 5x + 7y &= 170 \\ 13x + 4y &= 300 \end{aligned}$$

- (b) Determine the cost of one exercise book and the cost of one pen. (3 marks)

$$\begin{aligned} 20x + 28y &= 680 \\ 91x + 28y &= 2100 \\ \hline 71x &= 1420 \end{aligned}$$

$$x = 20$$

$$100 + 7y = 170$$

$$7y = 70$$

$$y = \underline{\underline{10}}$$

$$x = \underline{\underline{20}}$$

- (c) The trader sold all the pens at Ksh.165 to a shopkeeper. Calculate the percentage profit that the trader made. (3 marks)

$$11 \times 10 = 110$$

$$\frac{SP}{HP} \times 100$$

$$= \underline{\underline{50\%}}$$

- (d) If the trader sold all the exercise books to the shopkeeper generating a loss of 20%, determine the amount of the trader got after selling all the exercise books. (3 marks)

$$18 \times 20 = 360$$

$$360 = 100\%$$

$$20 = 80\%$$

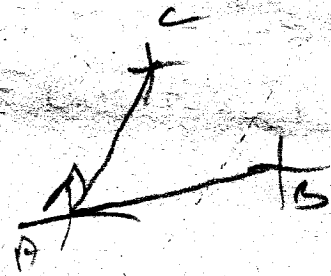
$$\frac{360 \times 80}{100}$$

$$= \underline{\underline{288}}$$

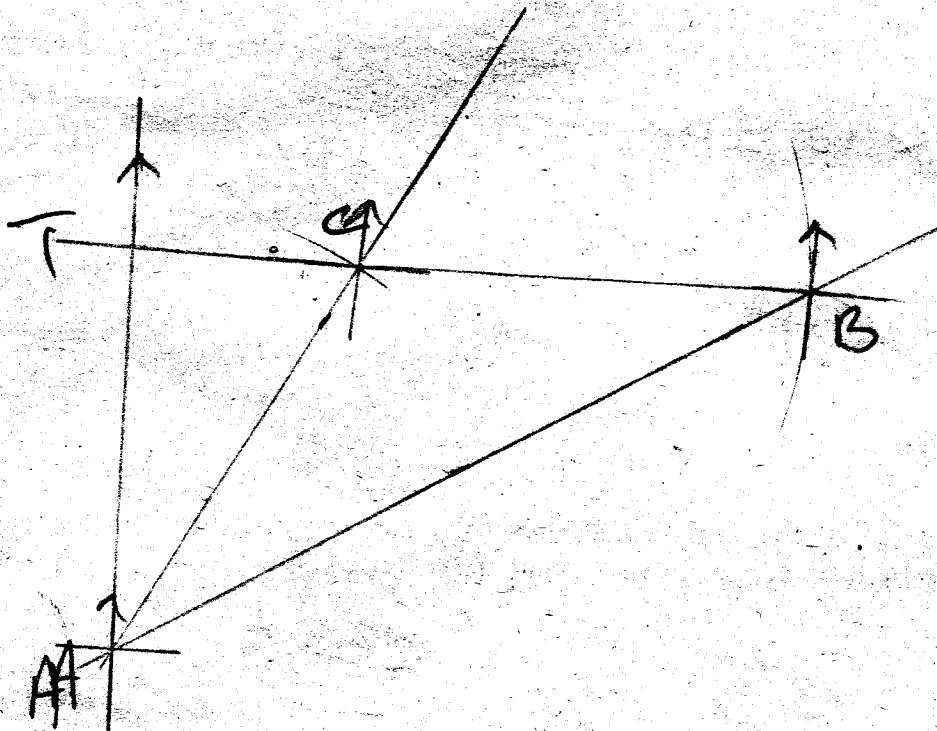
19. Three ships A, B and C are such that the bearing of B and C from A is 060° and 030° respectively. An Island T is due West of C and due North of A. It is further given that $BC = CA = 30\text{km}$. Using a scale 1cm to represent 5km , make a scale drawing to show the relative positions of the three ships and the Island T.

Hence find:

- (a) The distance between A and B. (4 marks)
- (b) The bearing of the Island T from A. (2 marks)
- (c) The distance between C and the Island T. (1 mark)
- (d) The bearing of B from C. (1 mark)
- (e) The distance between the Island T and A. (1 mark)



- (a) $10.4\text{cm} \times 5 = 52\text{km}$.
- (b) 0°
- (c) $3 \times 5 = 15\text{km}$.
- (d) 86°
- (e) $8.4 \times 5 = 27\text{km}$.



20. Two business partners Kamau and Jane contributed Ksh. 112,000 and 128,000 respectively, to start a business. They agreed to share their profit as follows:

- (i) 20% to be shared equally.
- (ii) 20% to be shared in the ratio of their contribution.
- (iii) 60% to be retained for the running of the business.

112 000 : 128 000
 56 : 64
 14 : 17

If their total profit for the year 1990 was Ksh. 86400. Calculate:-

- (a) (i) The amount each got in the 20% they shared equally. (2 marks)

$$\frac{20}{100} \times 86400 = 17,280$$

$$17,280 \times \frac{14}{31} = 7803.90$$

$$17,280 \times \frac{17}{31} = 9476.1$$

- (ii) The ratio of Kamau to Jane contribution in its simplest form. (1 mark)

14 : 17

- (iii) The total amount received by Kamau. (2 marks)

Sh 7803.90

- (iv) The total amount received by Jane. (2 marks)

Sh 9476.1

- (b) The amount retained for running the business to the nearest thousand Kenyan shillings. (3 marks)

$$\frac{60}{100} \times 86400 = 51,840$$

Sh 51,840

21. The relation between speed and time is given by the formula:

$$V = 4t + 5$$

The table below gives some values of V and t .

t	0	1	2	3	4	5	6
V	5	9	13	17	21	25	29

(a) Complete the table.

(2 marks)

(b) By using a scale of: 1 cm represents 1 unit in x -axis.
1 cm represents 5 units in y -axis

Draw a graph of V against t .

(3 marks)

(c) Use your graph to find:

(i) V when $t = 2.5$

(1 mark)

(ii) V when $t = 4.5$

(1 mark)

(iii) t when $V = 10$

(1 mark)

(iv) t when $V = 15$

(1 mark)

(v) V when $t = 0$

(1 mark)

