

FORM FOUR CLUSTER KCSE MODEL5

MATHEMATICS PAPER 1 QUESTIONS

SECTION I (50 Marks)

Answer ALL questions

1. Use the factor method to evaluate $\frac{(13,824 \times 0.000125)^{\frac{1}{2}}}{1.1664^{\frac{1}{2}}}$ and leave your answer in the form $\frac{a}{b}$

where a and b are integers.

2. Factorize completely $(5x - 4)^2 (-3x - 1)^2$

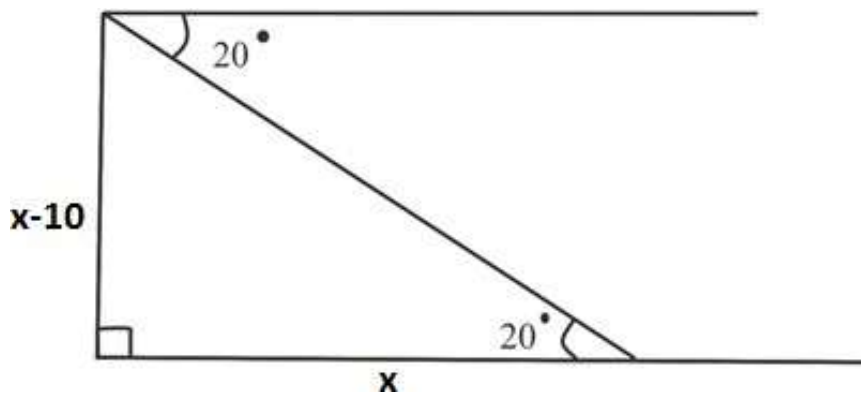
3. Solve for x in the inequalities below and hence find the sum of all possible integral primo numbers satisfying the inequalities.

$$\frac{1}{4}x - 1 < \frac{1}{2}x + 1 \leq \frac{1}{3}x + 4$$

4. Find the exact value of x if $13^{x+1} - 13^{x-2} - 4824612 = 0$

5. The point (-4, 5) is the image of the point (3, -10) under a translation. Find the coordinates of the point whose image is (-1, -3) under this translation.

6. From the top of a cliff the angle of depression of a boat is 20°. If the height of the cliff is 10m less the horizontal distance of the boat from the cliff. Find the height of the cliff.

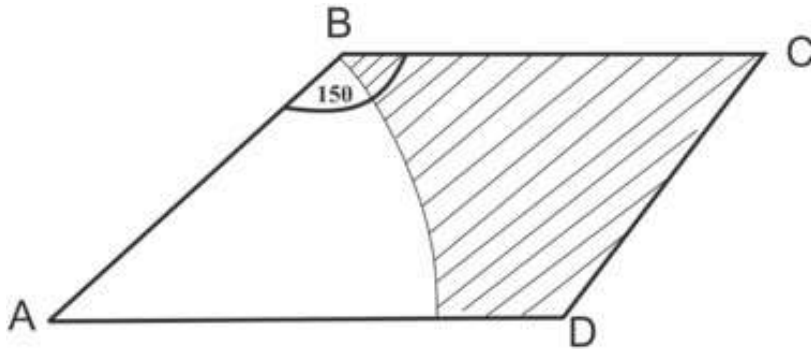


7. If angle x is acute and that $\sin x = \cos 0.6x$ find without using table or calculators, the value of $\tan \frac{x}{15}$.

8. When a market price is shs 960, a loss of 4% is realized. What will be the % profit if the article is sold at a new marked price 15% more than the cost price and a discount of shs 120 is offered.

9. Simplify the expression $\frac{4x - 9x^3}{3x^2 - 4x - 4}$

10. Determine the equation of the line passes through $(-1, 3)$ and is perpendicular to $2y - 3x = 6$.
11. Calculate the area of the shaded region in the figure below, A,B,C D is a parallelogram, ABM is sector centre A, radius 7cm, AB=7 cm, AD=10 cm and angle ABC is



10. In a certain school, $\frac{3}{10}$ of the students are boys. On a certain day $\frac{1}{6}$ of the boys were absent and $\frac{2}{5}$ of the girls were absent. If 165 students were absent, find the number of students in the school.
11. Use logarithm tables to evaluate the following:
- $$\sqrt[3]{\frac{415.2 \times 0.0761}{135}}$$
12. Two churches have a total of 500 members, the difference between members of the two churches is 200. How many members are there in each church.
13. A hemispherical container of radius 3.5 cm is completely filled with water. Three quarters of the water is poured into an empty cylindrical container such that the water level in the cylinder is 3.5 cm high. Determine the radius of the cylinder.
14. Marks of 14 students in math's CAT were recorded as follows 26,22,15,19,20,16,27,15,19,22,21,20,22 and 28. Determine the median mark.

SECTION II (50 Marks)

Answer any FIVE questions.

15. The table below gives the field book showing entries of Migingo Island after a survey. All entries were recorded in km.
- Sketch a diagram to show relative position of the Island.
 - Using the sketch map, calculate the area of Migingo in Hectares.

| | | |
|-----|-----|-----|
| | 100 | OU |
| | 75 | 50k |
| X35 | 50 | 35s |
| | 35 | |
| | 25 | 35T |
| | 10 | 40M |
| R25 | 0 | |

a) Sketch a diagram to show relative position of the Island.

c) Using the sketch map, calculate the area of Migingo in Hectares.

16. B is 102 km, on the bearing 112° from A. C is 94 km on the bearing of 062° from B. D is 073° from A and 336° from C.

(a) Using a scale of 1cm represents 20 km, determine:

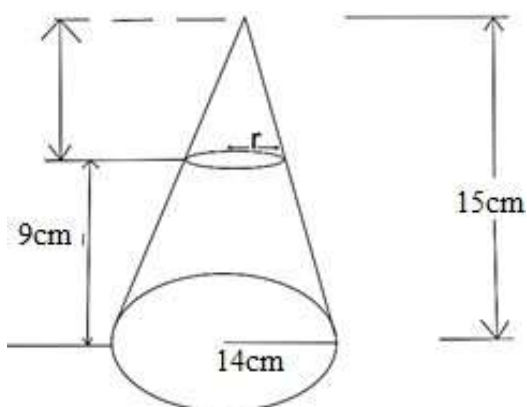
(i) The position of A, B, C and D.

(ii) The bearing of B from D and A from C.

(iii) The distance AC and BD.

(b) An aircraft flies from town A to D via B and C at a constant speed of 500km/hr. Determine the time taken by the aircraft in flying from A to D.

17. The figure below shows a right circular closed cone of base radius 14 cm and a vertical height of 15cm it is partly filled with water to a depth of 9 cm.

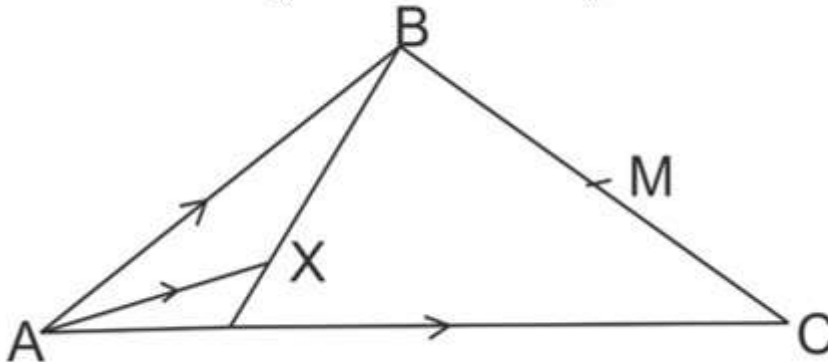


a) Calculate the volume of the water.

b) Find the radius of the smaller cone.

c) Calculate the surface area in contact with water.

In the triangle ABC below, $AB = 3\vec{b}$ and $AC = 2\vec{c}$. $BX = \frac{4}{13}\vec{c} - \frac{30}{13}\vec{b}$. Point M divides BC in the ratio 2:3. Line BX has been produced to meet AC at point N.



(a) Find the following vectors in terms of \vec{b} and \vec{c} .

(i) \vec{AX}

(ii) \vec{AM}

(b) Prove that points A, X and M are collinear and state the ratio in which X divides AM.

(c) Given that $BX : XN = 10 : 3$, find the ratio in which N divides AC.

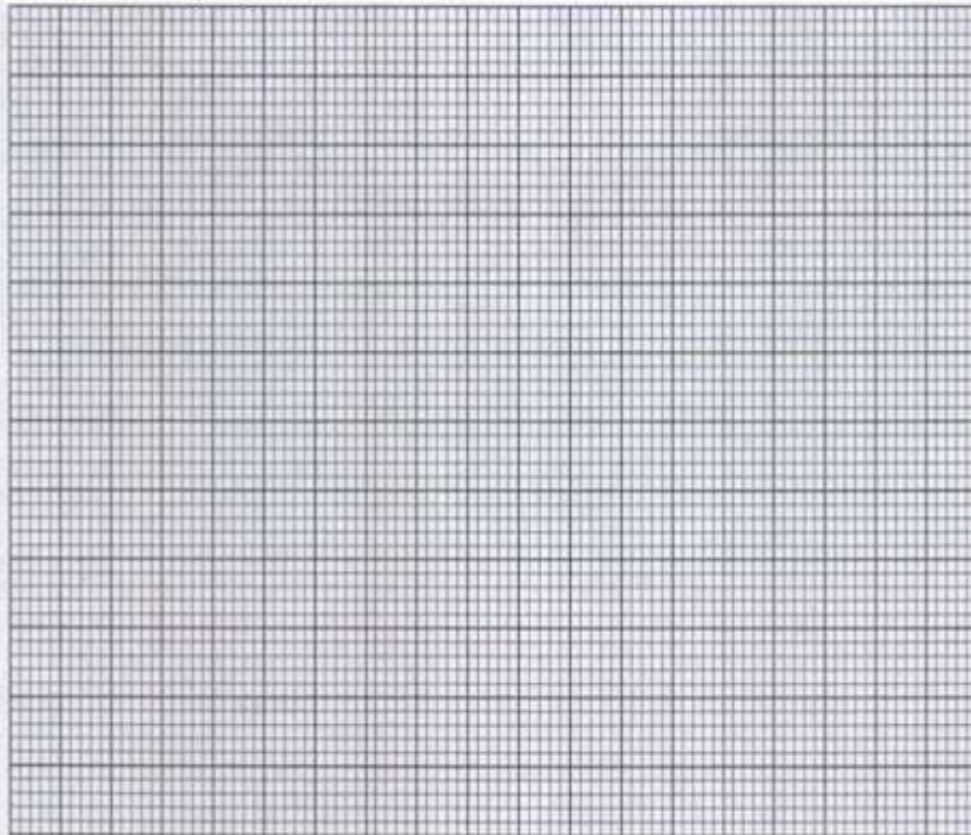
18. A bus left point A at 7.00 a.m. travelling at 84 km/h and heading to point B. At a certain time after the bus had left, a car left point A and was headed for B travelling at speed of 125 km/h. The car met the bus at 10.45 a.m.

(a) At what time did the car leave point A and how far had the bus travelled at this time.

(b) Despite the fact that the car stopped for 30 minutes at the instance. It caught up with the bus and still reached B 30 minutes earlier. Determine the distance between A and B and the time the car caught up with the bus the second time.

19. A quadrilateral ABCD with A, (1, 1) B, (3, 0) C, (4, 2) and D (0, 3). On the grid below draw ABCD.

- (a) Draw $A^1B^1C^1D^1$ which has coordinates $A^1(-3,1)$, $B^1(-2,3)$, $C^1(-4,4)$, $D^1(-5,0)$ on the same axes and fully explain the transformation that will map ABCD onto $A^1B^1C^1D^1$



- (b) Draw $A^{11}B^{11}C^{11}D^{11}$ which has co-ordinates $A^{11}(-3,3)$, $B^{11}(-2,-5)$, $C^{11}(-4,-6)$ and $D^{11}(-5,-2)$ which is the image of ABCD under a single transformation. Fully describe the transformation.
- (c) Draw $A^{111}B^{111}C^{111}D^{111}$ the image of ABCD under an enlargement with the centre (2, 3) and a linear scale factor of -1.5 and state its co-ordinates.

20. (a) Using a ruler and a pair of compasses only construct a rhombus ABCD such that $AB=6$ cm and $\angle ABC=135^\circ$.
- (b) Drop a perpendicular from C to AB extended meeting AB at N. Measure BN and CN.
- (c) Bisect $\angle ABC$ and $\angle DAB$, Let the two bisectors meet at M. Measure AM.
- (d) Determine the area of ABM
21. Parents of Miwani Secondary decided to buy a school bus costing sh 3,600,000. Each parent was to contribute the same amount of money. Before they bought the bus 60 parents transferred their children to St. Lukes Secondary school hence the remaining parents had to contribute kshs 2,000 more.
- (a) Determine the original number of parents.
- (b) How much did each parent contribute at the end.