**NAME** …………………………………………………………. **ADM NO** ………………….

**SCHOOL** …………………………………………………………… **DATE** ……………………

 **CANDIDATE’S SIGNATURE** …………………..

**FORM 2**

**MATHEMATICS**

**DECEMBER 2021 TIME:** $2^{1}/\_{2} HOURS$

**END OF TERM TWO 2021 EXAMINATIONS**

**Kenya Certificate of Secondary Education**

**MATHEMATICS**

**INSTRUCTIONS TO CANDIDATES**

1. Write your name, admission number and school in the spaces provided.
2. This paper consists of two sections; **Section I** and **Section II.**
3. Answer ALL the questions in Section I and Section II.
4. All answers and working must be written on the question paper in the spaces provided below each question.
5. Show all the steps in your calculations, giving your answer at each stage in the space provided below each question.
6. Marks may be given for correct working even if the answer is wrong.
7. Non programmable silent electronic calculators and **KNEC** mathematical tables may be used except where stated otherwise.
8. Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing.

FOR EXAMINERS USE ONLY

SECTION I

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Question** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** | **16** | **TOTAL** |
| **Marks** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

SECTION II

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Question** | **17** | **18** | **19** | **20** | **21** | **TOTAL** |
| **Marks** |  |  |  |  |  |  |

 **Grand Total**

**SECTION I (50 Marks)**

**Answer all questions in the spaces provided**

1. Evaluate

 $\frac{-3\left(4+2\right)-8 ÷ 4 + 3}{-2× -4 + -6×5}$ (3 marks)

1. Find the value of x, which satisfies the equation.

  (3 marks)

1. Evaluate; (3 marks)

$$14÷\frac{1}{3}of 5\frac{1}{4}-3\frac{3}{4} ×1\frac{1}{3}$$

1. Find the length of a square whose diagonal is 8cm to one decimal place (3 marks)
2. The figure below represents a kite ABCD, AB = AD = 15cm. The diagonals BD and AC intersect at O, AC = 30cm and AO = 12cm.

 

Find the area of the kite. (3 marks)

1. Using logarithm tables evaluate; (4 marks)

$$\sqrt[3]{\frac{4.684 ×2.497}{\tan(87°)}}$$

1. A straight line L passes through the point (3, -2) and is parallel to a line whose equation is $2y-4x=1.$ Find the equation of line L in the form $y=mx+c.$ (3 marks)
2. . The figure below is a triangle XYZ. ZY = 13.4cm, XY = 5cm and $∠XYZ = 57.7°$



Find the area of triangle XYZ. (3 marks)

1. Using a ruler and a pair of compass only, construct a parallelogram ABCD such that $AB= 8 cm$, $BC = 6 cm$ and angle $ABC = 135°$. (3 marks)
2. Write the following as a single fraction (3 marks)

 $\frac{(2x+1)}{4}-\frac{2x-1}{3}$

1. Calculate the length of an arc of a circle radius 14cm that is subtended by an angle $22.5 ^{0}$at the centre (3 marks)
2. Given that $\cos(A=^{5}/\_{13})$ and angle A is acute, find the value of $2\tan(A+3\sin(A))$. (3 marks)
3. Two similar containers have base areas of $750 cm^{2} and 120 cm^{2}$ respctively.
4. Find the ratio of their radii (1 mark)
5. Find the ratio of their volume. (1 mark)
6. Calculate the volume of the larger container if the volume of the smaller container is 400$cm^{3}$ (2 marks)
7. A plane leaves town P to town Q on a bearing of $130° $and a distance of 350 km. it then flies to town R 500km away and on a bearing $060°.$ Find by scale drawing the distance of R from P (3 marks)
8. Simplify the expression; (3 marks)

$$ \frac{2t^{2}-3pt-2p^{2}}{4t^{2}- p^{2}}$$

1. If O is the center of part of the circle shown below, find the area of the figure (3 marks)

 

**SECTION II (50 Marks)**

**Answer ALL questions in this section in the spaces provided.**

1. Saleswoman is paid a commission of 2% on goods sold worth over Ksh 100 000. She is also paid a monthly salary of Ksh 12 000. In a certain month, she sold 360 handbags at Ksh 500 each.
	1. Calculate the saleswoman’s earnings that month. (3 marks)
	2. The following month, the saleswoman’s monthly salary was increased by 10%. Her total earnings that month were Ksh 17 600.

Calculate

1. the total amount of money received from the sales of handbags that month; (5 marks)
2. The number of handbags sold that month. (2 marks)
3. A triangle whose vertices are $A^{' }\left(-2,-2\right)$ $B^{'} \left(-4, -1\right)$ and $C^{'}\left(-3, 1\right)$ is an image of a triangle whose vertices are $A \left(1,1\right)$, $B \left(2, 3\right)$ and $C \left(4, 2\right)$ under a rotation.
4. On the grid below, draw the $x$ and $y$ axes such that values of $x$ range between $-6 and 6$ and values of $y $range between $-7 and 3$. (1 mark)

**Provide a graph paper**

1. Draw the triangles ABC and $A'B'C'$ on the same axes. (2 marks)
2. Hence determine the centre and angle of rotation. (4 marks)
3. $A''B''C''$ is the image of $A'B'C'$ under enlargement centre $\left(-2, 3\right)$ and scale factor 2. Draw $A''B''C''$ and state its coordinates. (3 marks)
4. A small cylinder of radius 3.5cm and height 10 cm has a mass of 385 kg , Calculate
5. The volume of the cylinder in $m^{3} ( Take π=\frac{22}{7})$ (3 marks)
6. The density of the materials making the cylinder in kg/$m^{3}$ (2 marks)
7. The cylinder was melted and the molten materials recasted into four identical cuboids each of a square base of side $x cm$ and height 10cm. Determine the value of $x$ to 4 significant figures. (5 marks)
8. The figure below shows two circles each of radius 10.5 cm with centres A and B. the circles touch each other at T.



Given that $angle XAD =angle YBC = 160°$ and lines XY, ATB and DC are parallel. Calculate the area of:

1. The minor sector AXTD (2 marks)
2. Figure AXYBCD (6 marks)
3. The shaded region (2 marks)
4. A glass of radius 3 cm in the form of a cylinder contains water to a height of 9 cm.
5. Find the volume of the water in the glass correct to 2 decimal places in cubic centimetres. (2 marks)

1. When a spherical marble is submerged into the water in the glass, the water level rises by 1 cm.

Calculate;

1. The volume of the marble correct to 2 decimal places. (2 marks)
2. Radius of the marble correct to 2 decimal places. (3 marks)
3. If the height of the glass is 13 cm, calculate the surface area of glass not in contact with water after the above process. (3 marks)