**NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ADM NO: \_\_\_\_\_\_\_\_\_\_\_\_CLASS:\_\_\_\_\_\_\_\_\_\_**

**DATE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ SIGN: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_TARGET\_\_\_\_\_\_\_\_\_\_**

**FORM THREE**

**MATHEMATICS**

**MID-TERM EXAM**

**TERM 1, 2024**

**INSTRUCTIONS: (Answer all the questions) TIME: (1 ½ HOURS)**

1. The length and width of a rectangle is given by 5.0cm and 3.24 cm respectively. Calculate the percentage error in the calculation of its perimeter (3mks)

2. Simplify $\frac{7}{\sqrt{5}+ \sqrt{3}}$ - $\frac{7}{\sqrt{5}- \sqrt{3}}$ (3mks)

3. Solve the simultaneous equations

xy = 4

x + y = 5 (3mks)

4. Solve for in (2mks)

5. By using completing square method, solve for *x in* 4x2 – 3x – 6 = 0 (3mks)

6. Simplify the following. (3 mks)

$\frac{2x-4}{12-3x^{2}}$ - $\frac{1}{3x+6}$

7.Find the percentage error in the quotient in $9.16cm÷2.0cm$ (3mks)

8.A group of teachers decided to raise ksh. 144,000 to buy a plot of land. Each teacher was to contribute the same amount. Before the contributions were made five of the teachers retired. The remaining teachers had each to contribute more by ksh. 2400 to meet their target. If there were x teachers originally.

i. Write down an expression for the amount that teachers were to contribute originally. (1mk)

ii. Write down an expression for the amount that each teacher was to contribute after five teachers

retired. (1mk)

Write down an equation in x and solve for x. (5mks)

1. Calculate the percentage increase of the contribution per teacher. (3mks)

9.Draw on the same set of axes, the graph of y = Sin x and y = 2cos x in the range

1. < x < 360 Using a scale of x axis 1 cm rep 300, y axis 1 cm rep 0.5 units. (10mks)

 Use the graph to solve the following

 i. sin x = 0.5

 ii 2cos x = 0.8

 iii. sin x = 2cos x

10.(a) Given that y = 7 + 3χ - χ², complete the table **below**. (2mks)

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| χ | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| y | -11 |  |  | 7 |  |  |  |  |  | -11 |

1. On the grid provided and using a suitable scale draw the graph of

y = 7 + 3χ - χ². (3mks)

1. On the same grid draw the straight line and use your graph to solve the equation

χ² - 4χ – 3 = 0. (3mks)

1. Determine the coordinates of the turning point of the curve. (2mks)