

EDUZEDCO
Form 4 Mathematics Paper 1 Examination

Subject: Mathematics | Class: Form 4 | Duration: 150 min | Total Marks: 100

INSTRUCTIONS TO CANDIDATES:

1. Write your name and index number in the spaces provided.
2. This paper consists of TWO sections: Section I and Section II.
3. Answer ALL questions in Section I and any FIVE questions from Section II.
4. Show all the steps in your calculations, giving your answers at each stage.
5. Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

SECTION I (50 Marks)

Answer all questions in this section.

1. Evaluate: $\frac{3}{4} + \frac{2}{3} \times \frac{9}{8} - \frac{1}{2}$

(3 marks)

2. Simplify: $\sqrt{72} + \sqrt{50} - \sqrt{8}$

(3 marks)

3. Expand and simplify: $(3x - 2)(x + 4) - (x - 1)^2$

(3 marks)

4. Solve for x : $\frac{2x - 3}{4} + \frac{x + 1}{3} = 2$

(3 marks)

5. Solve the inequality: $3x - 4 \leq 2x + 5$ and represent the solution on a number line.

(3 marks)

6. Simplify: $\frac{2^3 \times 3^2}{2^2 \times 3^3}$

(3 marks)

7. Find the equation of the line passing through points $A(2, 3)$ and $B(4, 7)$.

(3 marks)

8. Calculate the area of a trapezium with parallel sides 8 cm and 12 cm and height 5 cm .

(3 marks)

9. A trader buys goods worth Ksh. $\text{\$}50,000$ and sells them at a profit of 15% . What is the selling price?

(3 marks)

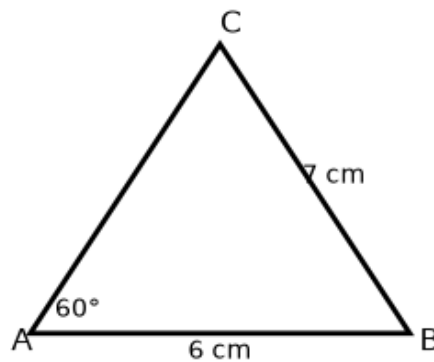
10. Divide Ksh. $\text{\$}360,000$ among three people in the ratio $2:3:5$.

(3 marks)

11. Given that $\sin \theta = \frac{3}{5}$, find $\cos \theta$ and $\tan \theta$.

(3 marks)

12. Construct a perpendicular bisector of a line segment AB of length 6 cm .



(3 marks)

13. A ship sails 30 km due East from port P to point Q . From Q , it sails 40 km due North to point R . Find the distance PR and the bearing of R from P .

(4 marks)

14. Given matrices $A = \begin{pmatrix} 2 & -1 \\ 3 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 0 \\ -2 & 3 \end{pmatrix}$, find $2A - B$.

(3 marks)

15. The first term of an arithmetic progression is \$5\$ and the common difference is \$3\$. Find the \$10^{\text{th}}\$ term.

(3 marks)

16. Solve the inequalities: $x + y \leq 4$, $x \geq 0$, $y \geq 0$ and shade the feasible region.

(4 marks)

SECTION II (50 Marks)

Answer any FIVE questions from this section.

17. A cylinder of radius 7 cm and height 20 cm is melted and recast into a cone of radius 14 cm . Find the height of the cone.

Calculate the volume of the cylinder.

Set up the volume equality and solve for the height of the cone.

(10 marks)



18. Mr. Kamau earns a monthly basic salary of Ksh. \$120,000. He is entitled to a personal relief of Ksh. \$2,400 per month. The tax brackets are: \$0-24,000\$: \$10\%\$, \$24,001-40,000\$: \$15\%\$, \$40,001-60,000\$: \$20\%\$, \$60,001-80,000\$: \$25\%\$, above \$80,000\$: \$30\%\$. Calculate his PAYE.

Determine the taxable income.

Compute the tax per bracket and total tax.

Subtract personal relief to get PAYE.

(10 marks)



19. The product of two consecutive positive integers is \$182\$. Find the integers.

Form a quadratic equation.

Solve the quadratic equation to find the integers.

(10 marks)

20. Two similar triangles have areas 36 cm^2 and 81 cm^2 . If the shortest side of the larger triangle is 9 cm , find the shortest side of the smaller triangle.

Find the linear scale factor using the area ratio.

Calculate the shortest side of the smaller triangle.

(10 marks)

21. A car starts from rest and accelerates uniformly at 2 m/s^2 for 10 seconds. It then maintains a constant speed for 20 seconds before decelerating uniformly to rest in 5 seconds. Calculate the total distance covered.

Calculate distance during acceleration phase.

Calculate distance during constant speed phase.

Calculate distance during deceleration phase.

Sum the distances.

(10 marks)

22. The marks of 20 students in a test are:
 $12, 15, 10, 8, 12, 14, 16, 9, 11, 13, 15, 12, 10, 14, 15, 11, 13, 12, 10, 14$. Calculate the mean, median, and

mode.

Organize the data into a frequency table.

Calculate the mean.

Determine the median.

Determine the mode.

(10 marks)



23. A point $P(2,3)$ is reflected in the x -axis to P' , then reflected in the line $y = x$ to P'' . Find the coordinates of P'' .

Reflect P in the x -axis to get P' .

Reflect P' in the line $y = x$ to get P'' .

(10 marks)



24. A triangle with vertices $A(1,2)$, $B(3,4)$, and $C(2,6)$ is rotated 90° clockwise about the origin. Find the coordinates of the image.

Apply rotation matrix to each vertex.

Write down the coordinates of the image.

(10 marks)

