Name ---------------------------------------------- Class -----------------------

Adm no ---------------------

MATHEMATICS PAPER 1.

TIME: 2 ½ HOURS

Instructions to candidates

1. Write your name, class and admission number in the spaces provided above.
2. This paper consists of two section; section I and Section II.
3. Answer all the questions in section I and only FIVE questions from section II.
4. All answer and working must be written on the question paper in the spaces provided below each question.
5. Show all the steps in your calculation, giving your answer at each stage in the spaces provided below each question.
6. Non – programmable silent electronic calculators and KNEC mathematical tables may be used unless stated otherwise.

For examiners use only.

 SECTION I

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

SECTION II

GRAND TOTAL

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | TOTAL  |
|  |  |  |  |  |  |  |  |  |

SECTION 1(50 MARKS)

1. Evaluate without using a calculator. (3 marks)

$$\frac{-2\left(+5+3\right)-9 ÷3+5}{-3x-5\pm 2×4}$$

1. Three consecutive odd numbers add up to 369. Determine the three numbers. (2 marks)
2. The position vectors of A and B are 3i +2j – 5k and 5i + 3j + 2k respectively. If C divide AB in the ratio 3:-2, express OC in term of I, j and k. (3 marks)
3. Line L passes through P(8,6) and perpendicular to the line 3y + 2x + 6 = 0. Find the equation of line L and write it in the form y = mx + c. (3 marks)
4. The distance between points P and Q on a section of a straight road is 12km. Mukai and Mutua left points P and Q respectively at the same time and moved towards each other at 1m/sec and 1.5 m/s respectively.

Calculate

1. Their relative speed (1 mark)
2. The time in hours that they took before meeting (2 marks)
3. Use tables of logarithms to evaluate $\frac{0.3}{0.0351}+√0.4983$ (4 marks)
4. Find the equation of the tangent which has a positive gradient too the curve

y = 3x2 – 2x + 5 at the point where y = 13 (4 marks)

1. Juma, Ali and Hassan share the profit of their business in the ratio 3: 7: 9 respectively. If Juma receives kshs 60, 000. How much profit did the hassan get. (3 marks)
2. Simplify as far possible the following $\frac{4}{4-x^{2}}- x+2$ (3 marks)
3. Taps A and B can fill a water tank in 30 minutes and 25 minutes respectively while C can empty in 20 minutes. If the three taps are turned on for 18 minutes then A and C closed. How long would it take before the tank is filled? (3 marks)
4. In the triangle ABC below, show the locus P such that P is nearer to C than A, nearer to AC than to BC and less than 6 cm from A. (3 marks)
5. Solve for Ø in the equation. (3 marks)
sin (2Ø- 10 ) = - 0.5 for the range – 180 ° $\leq ∅° \leq 180°$
6. Solve the equation$ log2(x^{2}-9)=log2^{8+1}$ (3 marks)
7. The diameter and slant height of a con are state as 9.6 cm and 5.2cm respectively. Both measurements are given to the nearest 0.1cm

Calculate the percentage error in the area. (4 marks)

1. Find the range of values of X which satisfy the following in equalities simultaneously

 $4x-9 <6+x$

$8-3x \leq x+4 $and represent them on a number line. (3 marks)

1. The G.C.D of three numbers is 30 and their L.C.M IS 900. If two of the numbers are 150 and 60, what are other three possible third numbers? (3 marks)

**SECTION II (50 MARKS)**

**Answer five questions only**

1. .
2. Ina certain week, a business bought 18 bicycles and 16 radios for a total of kshs. 113,640. In the following week, he bought 14 bicycles and 12 radios for a total of kshs. 87,480. Using matrix method, find the price of each bicycle and each radio that he bought.
3. A trader sold an item at sh. 10,625 after allowing his customers 15% discount on the marked price of the item. In so doing he made a profit of 25%
4. Calculate the marked price of the item. (2 marks)
5. Calculate the price at which the trader had bought the item (1 mark)
6. If the trader had sold the item without giving a discount, calculate the percentage profit he would have made. (2 marks)
7. To clear his stock the trader decides to sell the remaining items at a loss of 10%. Calculate the price at which he sold each item. (1 marks)
8. .
9. .
10. .
11. .
12. The angle of elevation of the top of a tree from a point P on the horizontal ground 24.5°. from another point Q, five meters from P towards the base of the tree, the angle of elevation of the top of the tree is 33.2° \. Calculate to one decimal place the height of the tree. (4 marks)
13. Four points B, C, Q and D lie on the same plane. Point B due southwest point Q. point C is 70 Km on a bearing of s 60°E from Q. point D is equidistant from B, Q and C.
14. Using the Scale: 1 cm represents 10km, construct a diagram showing the position of B, C, Q and D. (4 marks)
15. Determine the distance between B and C (1 mark)
16. Determine the bearing of D from B. (1 mark)
17. The figure below shows a circle centre O PQRS is a cycle quadrilateral and QOS is a straight line



Giving reasons for your answers find the size of

1. Angle PRS (2 marks)
2. Angle POQ (2 marks)
3. Angle RPS (2 marks )
4. Angle PSR (2 marks)
5. Reflex angle POS (2 marks)
6. A room is constructed such that is eternal length and breadth are 7.5 cm and 5.3 m respectively. The thickness of the wall is 15cm and its height 3.3 metres. A total space of 5m2 is left for doors and windows on the walls.
7. Calculate the volume of:
8. The materials needed to construct the walls without the doors and windows (4 marks)
9. The blocks used in constructing the walls are 450mm by 200mm by 150mm. calculate the number of blocks needed to construct the room. (ignore the material used to join the blocks) (4 marks)
10. If each block costs sh 52.50, calculate the cost of buying the blocks. (2 marks)
11. .
12. A racing cyclist completes, the uphill section of a mountain course of 75km at an average of V km/hr. he then return to downhill along the same route an average of (v + 20 ) km/h. given that the differences between the timer is one hour, fro and solve an equation in V. hence
13. Find the total time taken to complete the uphill and the downhill sections of the course. (4 marks)
14. Calculate the cyclist’s average speed over the 150km. (1 mark)
15. A train moving at an average speed of 72km/hr takes 15 seconds to completely cross a bridge that is 80m long.
16. Express 72km/hr in metres per second. (2 marks)
17. Find the length of the train in meters. (3 marks)