**Name…………………………………….. Class ….…………………**

**Sign …………………..…… ADM NO………………………**

**MATHEMATICS**

**PAPER 1**

**TIME: 2 ½ HOURS**

**Instructions to candidates**

1. Write your name, index and class number in the spaces provided above.
2. The paper consists of two sections**: *section I*** and ***section II*.**
3. Answer **all** the questions in **section I** and any **five** in **section II**
4. Section I has **sixteen** questions and section two has **eight** questions
5. All answers and working must be written on the question paper in the spaces provided below each question.
6. Show all the steps in your calculations, giving your answers at each stage in

the spaces below each question

1. KNEC Mathematical table and silent non-programmable calculators

may be used.

**For examiner’s use only**

**Section I**

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

**Section II**

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

 Grand

 Total

1. Evaluate: (3 mks)

 -2

 $\left(\frac{\left(1\frac{3}{7}- \frac{5}{8}\right) x \frac{2}{3}}{\frac{3}{4}+ 1\frac{5}{7} ÷ \frac{4}{7} of 2 \frac{1}{3}}\right)$

1. Mr. Kamau son and daughter needed clothes. The son clothes were costing Ksh 324 while the daughter clothes were costing Ksh 220. Mr Kamau wanted to give them equal amounts of money. Calculate the least amount of money he would spend on the two and how many clothes each will buy. (3 mks)
2. Use reciprocal tables to find the value of $\left(0.325 \right)^{-1 }$hence evaluate $\frac{\left(\sqrt[3]{0.000125}\right)}{0.325}$ , give your answer to 4 s.f. (3 mks)
3. A type of paper is 40cm long, 32 cm wide and 0.8 mm thick. The paper costs sh 10 per m2. Find the total cost of a pile of such paper of height 4.8m. (4 mks)
4. A square based brass plate is 2mm high and has a mass of 1.05kg. The density of the brass is 8.4 g/cm3. Calculate the length of the plate in centimeter. (3 mks)
5. Solve for x in the equation: (3 mks)

$$\frac{x-3}{4}- \frac{x+3}{6}= \frac{x}{3}$$

1. A salesman earns 3% commission for selling a chair and 4% commission for selling a table. A chair fetches K£ 75. One time, he sold ten more chairs than tables and earned seven thousand, two hundred Kenya shillings as commission. Find the number of tables and chairs sold. (4 mks)
2. Using the three quadratic identities only factorise and simplify: (3 mks)

$$\frac{\left(x-y\right)^{2}- \left(x+y\right)^{2}}{\left(x^{2}+ y^{2}\right)^{2}- \left(x^{2}- y^{2}\right)^{2}}$$

1. Two numbers are in the ratio 3 : 5. When 4 is added to each the ratio becomes 2 : 3. What are the numbers? (3 mks)
2. Given that Sin (x + 40) = Cos (3x)0. Find tan (x + 400) to 4 s.f. (3 mks)
3. In a regular polygon, the exterior angle is 1/3 of its supplement. Find the number of sides of this polygon. (3 mks)
4. Find the area of a segment of a circle whose arc subtends an angle of 22 ½0 on the circumference of a circle, radius 10cm. (3 mks)
5. An airplane leaves point A (600S, 100W) and travels due East for a distance of 960 nautical miles to point B. determine the position of B and the time difference between points A and B. (3 mks)
6. Mr. Onyango’s piece of land is in a form of triangle whose dimensions are 1200M, 1800M and 1500M respectively. Find the area of this land in ha. (Give your answer to the nearest whole number). (3 mks)
7. Two men each working for 8 hours a day can cultivate an acre of land in 4 days. How long would 6 men, each working 4 hours a day take to cultivate 4 acres? (3 mks)
8. Find the equation of a straight line which is perpendicular to the line 8x + 2y - 3 = 0 given that they intersect at y = 0 leaving your answer in a double intercept form. (3 mks)

**SECTION B**

1. (a) Use the mid-ordinate rule to estimate the area bounded by the curve y = x + 3x-1, the x-

 axis, lines x = 1 and x = 6. (4 mks)

(b) Find the exact area of the region in (a) above. (3 mks)

(c) Calculate the percentage error in area when mid-ordinate rule is used. (3 mks)

1. A car whose initial value is Ksh 600,000 depreciates at a rate of 12% p.a. Determine:
2. Its value after 5 years. (4 mks)
3. Its value of depreciation after 5 years. (2 mks)
4. The number of year it will take for the value of the car to be Ksh 300,000 (3 mks)
5. A square whose vertices are P (1,1) Q (2,1) R(2,2) and S (1,2) is given an enlargement with centre at (0,0). Find the images of the vertices if the scale factors are: (3 mks)
6. -1
7. ½
8. 3

 (b) If the image of the vertices of the same square after enlargement are P1 (1,1), Q1 (5,1),

 R1(5,5) and S1 (1,5) find:

 (i) the centre of enlargement (2 mks)

 (ii) the scale factor of the enlargement (2 mks)

1. On the graph paper provided plot the point P (2,2) Q (2,5) and R (4,4).
2. Join them to form a triangle PQR. (1 mk)
3. Reflect the triangle PQR in the line X = 0 and label the image as P1 Q1 R1. (2 mks)
4. Triangle PQR is given a translation by vector. T $\left(\begin{matrix}2\\2\end{matrix}\right)$ to P11 Q11 R11. Plot the triangle P11 Q11 R11. (3 mks)
5. Rotate triangle P11 Q11 R11 about the origin through -900. State the coordinates of P111 Q111 R111. (3 mks)
6. Identify two pair of triangles that are direct congruence. (1 mk)
7. Three warships P, Q and R are at sea such that ship Q is 400 km on a bearing of N300 E from ship P. ship R is 750 km from ship Q and on a bearing of S600E from ship Q. an enemy warship is sighted 1000 km due south of ship Q.
8. Use scale drawing to locate the position of ships P, Q, R and S. (4 mks)
9. Find the compass bearing of: (2 mks)
10. Ship P from ship S
11. Ship S from ship R
12. Use scale drawing to determine: (2 mks)
13. The distance of S from P
14. The distance of R from S
15. Find the bearing of: (2 mks)
16. Q from R
17. P from Q
18. The table below shows the amount in shillings of pocket money given to students in a particular school.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pocket money (Kshs) | 201 – 219 | 220 – 229 | 230 – 239 | 240 – 249 | 250 – 259 | 260 – 269 | 270 – 279 | 280 – 289 | 290 – 299 |
| No. of students | 5 | 13 | 23 | 32 | 26 | 20 | 15 | 12 | 4 |

1. State the modal class. (1 mk)
2. Calculate the mean amount of pocket money given to these students to the nearest shilling. (4 mks)
3. Use the same axes to draw a histogram and a frequency polygon on the grid provided. (5 mks)
4. Given that points X (0,-2), Y (4, 2) and Z (x,6);
5. Write down the column vector $\vec{XY}$. (1 mk)
6. (i) Find $\left|\vec{XY}\right|$ leaving your answer in index form. (3 mks)

 (ii) Given that $\left|\vec{XZ}\right|$ = 11.3170, find the coordinates of Z. (3 mks)

1. Find the mid-point of the line YZ. (3 mks)
2. A bus and a matatu left Voi from Mombasa, 240 km away at 8.00 am. They travelled at 90 km/h and 120 km/h respectively. After 20 minutes the matatu had a puncture which took 30 minutes to mend. It then continued with the journey.
3. How far from Voi did the catch up with the bus. (6 mks)
4. At what time did the matatu catch up with the bus? (2 mks)
5. At what time did the bud reach Mombasa? (2 mks)