**Name: ………………………………….……… Index Number ………………./……………**

**121/1 Candidate’s signature …………………………**

**Mathematics Date: ………………………………………**

**Paper 2**

**TIME: 2 ½ Hours**

**MAKUENI COUNTY PREPARATORY EXAMINATION 2017**

**MATHEMATICS 121/2**

**TRIAL 1**

**Instructions to Candidates**

1. Write your name and Index Number in the spaces provided.
2. Sign and write the date of examination in the spaces provided above.
3. Answer **ALL** the questions in the spaces provided in the question paper.
4. All working **MUST** be clearly shown where necessary.
5. Mathematical tables and electronic calculators may be used.
6. This paper consists of seven (18) Printed pages.
7. Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no question(s) are missing.

**For Examiners use only**

**Section I**

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

**Section II**

**GRAND**

**TOTAL**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Questions** | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | **Total** |
| **Marks** |  |  |  |  |  |  |  |  |  |

*This paper consists of 14 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.*

**MATHEMATIC PAPER 121|2**

**SECTION 1-50 MARKS**

1. Use logarithms correct to 4 significant figures to calculate (4mrks)
2. Simplify the expression

 (3mrks)

1. In the figure below xy= 8cm and O is the centre of a circle

 A O B

 X Y

 Determine the area of a circle if AOX=150to 2 d.p (3mrk)

4. Object P of area 10is mapped on to its image Q of area 60 by a transformation whose matrix is given by T =

 Find the possible value of x (3mks)

5. Evaluate (3mks)

6. If is a perfect square. Find the value of k (3mks)

7. The masses in kg of eight boys are 56,62,58,65,50,49, 57, 59. Find the interquatile

 deviation of the data (3mrks)

8. In the figure below AB is a diameter of the circle. Chord PQ intersects AB at N. A tangent to the circle at B meets PQ produced at R.

 P

 B

 14cm

 4cm

 N

 A

 Q 7.5cm

 R

Given that PN =14cm,NB=4cm and BR= 7.5cm. Calculate the length of

1. NR (Imk)
2. AN (1mk)

9. Calculate the time taken for sh. 40,000 to accumulate to Sh 47,840 at compound interest rate of 12% p.a. If compounding is done monthly. (Give your answer correct to the nearest whole number) (3mks)

10). A rectangularpiece of paper has a length of 8.792 cm and 0.00265 cm width. If each of the numbers are corrected to one significant figure, calculate the percentage error in area arising from this approximation (3mrks)

11) In the figure below,O is the centre of the circle .<ABC=1200

 AB=6cm and BC=4.5 cm

 B

 6cm 4.5cm

**1200**

 A C

**Calculate**

1. length AC (2mks)

 b) Radius of the circle (2mks)

12. The cost Cof operating a hardware is partly constant and partly varies as the square of labour input L. If C =25000 when L = 5 and C = 100,000 when L = 20. Find C when L=8 (4mrks)

13) A merchant blends 350 kg of tea costing Shs. 84 per kg with 140 kg of tea costing Shs. 105 per kg. At what price must he sell the mixture to gain 25% per kg (3mrks)

14. Solve the equation

 (2mrks)

15. The lines AD and CD are tangents to the circle ABC with center O and <ADC=20 0. Calculate the values of x and y (2mrks)

 **A**

 **B 200 D**

 **C**

16) Find the centre and the radius of a circle given the equation

 +

 (3mks)

17 The table below shows a monthly income tax rate for the year 2005

|  |  |
| --- | --- |
| **Monthly taxable income in Ksh** | **Tax rate percentage** |
| 1. - 9860
 | 10% |
| 9681-18800 | 15% |
| 18801-27920 | 20% |
| 27921-37040 | 25% |
| 37041 and above | 30% |

 Peters monthly earning in 2005 were as follows;

Basic salary Ksh 35,600, house allowance Kshs 12,000, Medical allowance Kshs. 2,800, transport allowance Kshs. 3,400, Peter was entitled to monthly tax relief of Kshs 1056.

**Calculate:**

a) His monthly taxable income (3mrks)

b)The monthly tax paid by peter (5mrks)

 c) In addition to tax the following deductions were made to Peters monthly income

- Service charge of Ksh 100

- Health insurance fund 320

2% of his basic salary as widow and child pension .calculate peters net pay that month (3mrks)

18. a) Fill in the table for the function

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 |
| y |  | -40 |  |  | 2 |  |  |  | 30 |

(2mrks

 b) Draw the graph on the graph paper (3mrks)

1. Use the graph to solve
2. - (1mrk)
3. (4mk)

19. The cost C of producing n items partly varies as n and partly as the inverse of n. To

 produce three items it cost Ksh.140 and to produce five items it costs sh 180.

 Find

a) the constants of proportionality and hence write the equation connecting c and n (5mks)

b) The cost of producing 15 items (2mks)

c) The number of items produced at a cost of Ksh 756 (3mks)

20. During a price giving day, the probability that the programme is not adjusted is 0.3. For two guest speakers, the probability of the second getting a chance is 0.4, if the programme is adjusted and 0.8 if the programme remains the same.

The first guest has a probability of 0.9 whether the programme is adjusted or not.

1. Draw a tree diagram to represent the events (3mks)
2. Using the tree diagram in (a) above determine the probability that:
3. Only one guest talks (3mks)
4. Both talk whether the programme is adjusted or not (2mks)
5. The programme is adjusted and at least one talks (2mks)

21. Seedpods are collected and weighed to the nearest gram as shown in the frequency distribution below

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Mass (gram) | 10 - 13 | 14 - 17 | 18 - 21 | 22 - 25 | 26 - 29 | 30 - 33 | 34 - 37 |
| Frequency  | 20 | 25 | 32 | 48 | 35 | 27 | 23 |

Using an assumed mean of 23.5 calculate

1. The mean mass (3mks)
2. The median (3mks)
3. The standard deviation (4mks)

22. Complete the table below for the function of y=sin and y=2cos for the

range -

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | -1800 | -1500 | -1200 | -900 | -600 | -300 | 00 | 300 | 600 | 900 | 1200 | 1500 | 1800 |
|  |  |  | -1 |  |  |  | 0.5 |  |  |  | 0.5 |  |  |
|  |  |  | 0 |  |  |  | 1.73 |  |  |  | -1.73 |  |  |

1. On the same axes draw the graphs of y = sin0 and y = 2cos0 (5mks)
2. Use your graph to solve the equation 2cos - sin= 0 (2mks)
3. State the amplitude of y = 2cos0 (1mk)

23. The figure below show a right pyramid on a square base ABCD and vertex Vo is the centre of the base AB = 14cm, VA = 20cm and V is the midpoint of BC.

 **V**

 **C**

 **D**

 **O**

 **A B**

Find

a) i) The height of the pyramid VO (2mks)

ii) The length VN (2mks)

b) The angle between (2mks)

 (i) BV and the plane ABCD (2mks)

 ii) VO and the plane BVC (2mks)

c). The volume of the pyramid (2mks)

24. Mumbua makes two types of cakes A and B. She takes 3 hours to make a type A cake and 4hours to make a type B cake. She works for a maximum of 120hours to make x type A cake and y type B cake. It cost her sh400 to make a type A cake and shs. 150 to make a type B cake. Her total cost does not exceed sh 9,000. She must make atleast 8 type A cakes and more than 12 type B cakes.

a) Write down four inequalities representing the information above (4mks

b) On the grid provided draw the inequalities and shade the unwanted regions. (4mks)

c) Mumbua makes a profit of sh 40 on each type A cake and Sh70 on each type B cake

 determine the maximum profit she makes. (2mks)