**Kenya Certificate of Secondary Education 2019**

**Secret Garden Education**

**121/ 2 Mathematics Paper 2**

**END TERM 1–Time :2 ½ hours**

**Name …………………………………………….……… Index Number…………………………..**

**Candidate’s Signature ………………….…...……….. Date ……………………………………**

**Instructions to candidates**

1. Write your name, admission number and class in the spaces provided above.
2. The paper contains two sections: **Section I** and **Section II**.

Answer **ALL** the question

1. s in **Section I** and **ANY FIVE** questions from **Section II**.
2. All working and answers must be written on the question paper in the spaces provided below each question.
3. Marks may be awarded for correct working even if the answer is wrong.
4. Negligent and slovenly work will be penalized.
5. Non-programmable silent electronic calculators and mathematical tables are allowed for use.
6. ***This booklet contains 17 printed pages. Please confirm that all the pages exist and are properly printed before starting the exam.***

**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 %**  **Mathepatics Pp 2**  **2019** |

Turn over

1. Using logarithm tables evaluate. (3mks)



2. Simply the following expression by reducing it to a simple fraction. (3mks)



1. Without using tables evaluate (3mks)

Log 147 – log 27

Log 14- log 6

4. A hollow cylindrical object is 80 cm long. The inner radius is 3 cm and outer radius is 3.5 cm.

a) Calculate the volume of the material used to make this hollow object. (Take π =3.142)

(2mks)

b) If the density of the material used to make the hollow object is 1.5g / cm3, find the mass of the material in kilograms. (2mks)

1. Find the Centre and radius of a circle whose equation is given as 3x2 + 3y2 + 18y – 24x – 72 = 0

(3mks)

1. (a) Find the first 3 terms in ascending powers of x of (2mks)

(b) Hence find the value of the constant K, for which the coefficient of x in the expansion of is -8 (2mks)

1. Simplify , leaving the answer in the form a + b, where a, b and c are rational numbers (2mks)
2. The cost, C of water is partly constant and partly varies as the number of litres L, consumed. Mary paid ksh.128.75 for 3 litres in March and sh.136.25 for 49 litres in February. Calculate

(a) Charge per unit and fixed charge (1mk)

(b) Bill for January if she consumed 23 litres (2mks)

1. The 2nd, 4th and 7th terms of A.P are the first 3 consecutive terms of a G.P. Find:

(a) The common ratio (2mks)

(b) The sum of the first eight terms of the G.P if the common difference of the A.P is 2. (2mks)

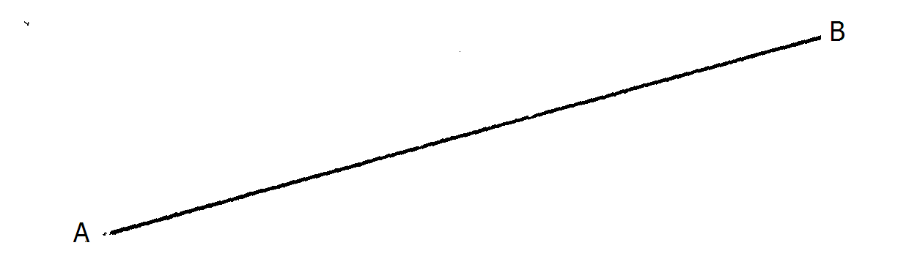
1. Calculate the variance of the numbers **7, 8, 7, 4, 6, 9, 8** (3mks)
2. A carrot patch is in the shape of trapezium. There are 13 carrot plants in the first row, 15 in the second row, 17 in the next and so on. If there are 47 plants in the last row, how many rows are there and how many plants? (3mks)
3. Given that . Evaluate  (3mks)
4. Use the inverse of to solve the equations. (3mks)

5x + 3y = 4

4y + 6x = 10

14. The figure below shows a line AB.

a) Without using a protractor, construct a line AC such that <BAC = 67.50 and AC = 10cm.



b) Using line AC divide line AB into 6 equal portions (3mks)

1. A man is twice as old as his son. 10 years ago the ratio of their ages was 5:2. Find their present age.

(3mks)

1. Evaluate  (3mks)

**SECTION II ( 50 MARKS)**

**Answer ONLY FIVE questions.**

17. The cost of a minibus was Sh. 950,000. It depreciated in value by 5 % per year for the first two years and by 15 % per year for the subsequent years

a) Calculate the value of the minibus after 5 years. ( 3mks)

b) After 5 years the minibus was sold through a dealer at 25% more than its value to Mr. X. If the dealer’s sale price was to be taken as its value after depreciation, calculate the average monthly rate of depreciation for the 5 years. (7mks)

18. A solution whose volume is 80 litres is made up of 40 % water and 60 % alcohol. When X litres of water are added, the percentage of alcohol drops to 40 %.

a) Find the value of x. (4mks)

b) Thirty litres of water is added to the new solution. Calculate the percentage of alcohol in the resulting solution. ( 2mks)

c) If 5 litres of the solution in (b) above is added to 2 litres of the original solution

Calculate in the simplest form, the ratio of water to that of alcohol in the resulting

Solution. (4mks)

1. P varies directly as the square of Q and inversely as R.

(a) If Q increases by 5% and R decreases by 10%, find the percentage change in P (5mks)

(b) Given that P=2 when R=5 and Q=4, find the positive value of Q when P=4.5cm and R=5 (5mks)

1. A circular board has eight equal sectors marked on it. When the arrow on the spinner is spun, it is equally likely to stop in any of the sectors marked 1 to 8, as shown in the diagram below. The spinner is spun once.

8

7

6

4

5

3

2

1

* 1. What is the probability that the score will be

1. A square number (2mks)
2. A prime number, or more than six, or both? (2mks)
   1. When the spinner is spun twice, find the probability that:
3. The sum of two scores will be 8 (3mks)
4. The difference of the two scores will be 3 (3mks)

E

D

F

G

H

C

A

B

M

N

24 cm

7 cm

5 cm

The figure above shows a cuboid in which AB = 24cm, BC = 7cm and CH = 5cm. M and N are the mid points of GH and BC respectively.

(a) Find the length of AC, AH and EM (4mks)

(b) Find the angle between

(i) AH and FH (4mks)

(ii) The line MD and the plane ABCD (2mks)

1. (a) Complete the table below for y = sin (2x – 300) and y = 2 cos x in the range -180 ≤ x ≤ 180. (2mks)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x0 | -180 | -150 | -120 | -90 | -60 | -30 | 0 | 30 | 60 | 90 | 120 | 150 | 180 |
| Sin(2x-30) |  |  | 1.00 | 0.5 | -0.50 |  |  |  | 1.00 | 0.5 |  | -1.00 | -0.50 |
| 2cos x | -2.00 | -1.73 | -1.00 |  |  |  | 2.00 |  |  | 0.00 |  | -1.73 |  |

(b) On the grid provided, plot on the same axes the graphs of y = sin (2x – 30) and y = 2cos x using the values above in (a)

Scale : 1cm to 300 on the horizontal axis

2cm to 1 unit on the y – axis. (5mks)



(c) Use your graph above to solve

Sin (2x – 30) = 2 cos x (1mk)

(d) Find the amplitude and period of the curve y = sin (2x – 30). (2mks)

1. Towns Q(00, 350W) and R(550N, 350E) are on the surface of the earth. On a Monday at 1300h

Local time, two aircrafts A and B each flying at 250 knots start simulteneously from R to Q. A

flies westwards to the longitude of Q then Southwards to Q. B flies Southwards to the latitude of

Q then Westwards to Q. Calculate each planes landing time at Q (10mks)

1. A doctor advised a patient to take tablets and capsules each day to provide for Vitamin

requirements. The patient is required to have at least 7 units of vitamin A and at least 60 units of

Vitamins B everyday. Each tablet has one unit of Vitamin A and 5 units of Vitamin B. Each

capsule has one unit of Vitamin A and 12 units of Vitamin B. Each tablet costs Ksh.1 and each

capsule costs Ksh.2. The patient purchases x tablets and y capsules everyday.

a) Write down four inequalities which must be satisfied by x and y. (3mks)

b) Represent the inequalities graphically and hence determine the number of tablets

and the number of capsules he should buy in order to make the total cost

a minimum (6mks)

c) State the minimum cost (1mk)