**Name……………………………………………….Adm No………..Class……**

**Index No………………………..** Signature…………………………

**121/1**

**Mathematics Paper 1**

**Form 4**

**2 ½ Hours**

**Term 2, July-2019**

**MOKASA II EXAMINATIONS**

***Kenya Certificate of Secondary Education (K.C.S.E)***

**INSTRUCTIONS TO CANDIDATES**

* Write your name and Admission number in the spaces provided at the top of this page.
  + This paper consists of two sections: Section I and Section II.
  + Answer ***ALL*** questions from section I and ***ANY FIVE*** from section II
  + All answers and workings must be written on the question paper in the spaces provided

below each question.

* + Show all the steps in your calculation, giving your answer at each stage in the spaces

below each question.

* + Non – Programmable silent electronic calculators and KNEC mathematical tables may be

used, except where 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**

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

**GRAND TOTAL**

**SECTION I 50 MARKS**

**(Answer all the questions)**

1. Without using mathematical tables or calculator, evaluate: Leaving the answer as a fraction in its simplest form. ***(2 marks)***
2. Use prime factors to evaluate ***(3 marks)***
3. Solve for ***m*** in the equation: ***(3 marks)***

1. (a) Find the greatest common divisor of the term. ***(1 mark)***

(b) Hence factorize completely this expression ***(2 marks)***

1. Solve for x if ***(3 marks)***
2. A car dealer charges 10% commission for selling a car. He received a commission of Ksh. 27,500 for selling a car. How much did the owner received from the sale of his car if the dealer added an extra charges of 5 %. ***(3 marks)***

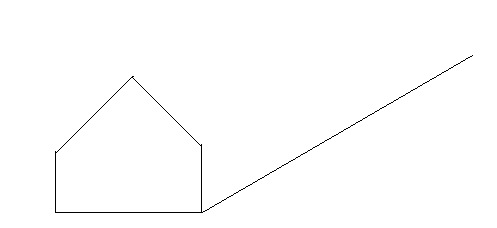
1. Two similar cylinders have diameter of 7cm and 21cm. If the larger cylinder has a volume of 6237cm³. Find the heights of the two cylinders. ***(3 marks)***
2. A sector of radius 12 cm subtends and angle of 700 at the centre. If the sector is folded to form a cone, calculate ;
3. The area of the curved part of the cone  ***(2 marks)***
4. The radius of the cone formed. ***(2 marks)***
5. Find all the integral values of ***x*** which satisfy the inequality ***(3 marks)***

1. The table below shows four principal crops produced in Kenya in the years 2000 and 2001. Use it to answer the questions below.

CROP AMOUNT IN METRIC TONNES

|  |  |  |
| --- | --- | --- |
| YEAR | 2000 | 2001 |
| Wheat  Maize  Coffee  Tea | 70,000  200,000  98,000  240,000 | 13,000  370,000  55,000  295,000 |

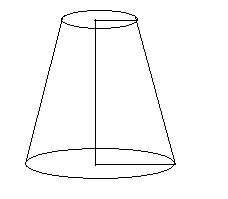
1. Using a radius of 5 cm, draw a pie chart to represent crop production in the year 2000. ***(3 marks)***
2. Calculate the percentage increase in wheat production between the years 2000 and 2001. ***(1 mark)***
3. Construct line AB 12.2 cm. Use a line X which meets line AB at A such that angle XAB is to divide line AB into 8 proportional parts. ***(3 marks)***
4. The cost of providing a commodity consists of transport, labour and raw material in the ratio 8:4:12 respectively. If the transport cost increases by 12% labour cost 18% and raw materials by 40%, find the percentage increase of producing the new commodity. ***(3 marks)***
5. A line L1 passes through point (-1,1) and perpendicular to the line L2  which makes an angle of 18.434948820 with the x-axis. Find the equation of L1 giving your answer in the double intercept form. ***(4 marks)***
6. Given that and find ***(4 marks)***
7. The exterior angle of a regular polygon is equal to one-third of the interior angle. Calculate the number of sides of the polygon and give its name. ***(3 marks)***
8. In the figure below, shows an irregular solid with a uniform cross-section. Complete the sketch, showing the edges clearly. ***(2 marks)***



**SECTION II (50 MARKS)**

***(Answer ANY FIVE questions in the spaces provided)***

1. The figure below shows a frustrum container with base radius 8 cm and top radius 6 cm. The slant height of the frustrum is 30cm as shown below. The container 90 percent full of water.



* 1. Calculate the surface area of the frustrum ***(3 marks)***
  2. Calculate the volume of water. ***(4 marks)***
  3. All the water is poured into a cylindrical container of circular radius 7cm, if the cylinder has the height of 35cm; calculate the surface area of the cylinder which is not in contact with water. ***(3 marks)***

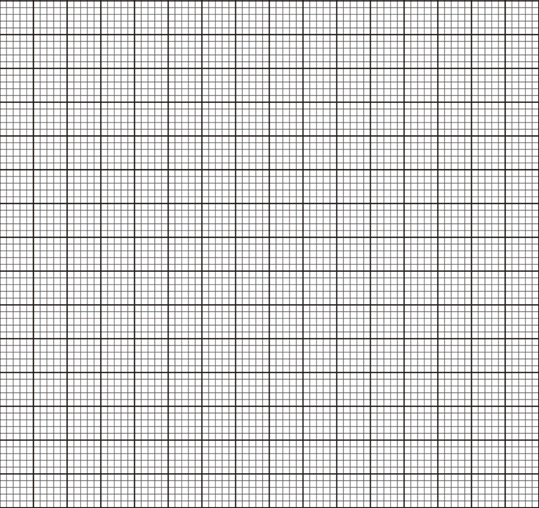
1. (a) Complete the table below for the function .

***(2 marks)***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **x** | **-3** | **-2** | **-1** | **0** | **1** | **2** | **3** | **4** |
| -x3 | 27 | 8 |  | 0 |  | -8 |  |  |
| 2x2 | 18 | 8 | 2 | 0 |  |  |  |  |
| -4x |  | 8 |  | 0 |  |  |  | -16 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| y |  | 26 |  | 2 |  | -6 |  | -46 |

1. On the grid provided below draw the graph of

for   ***(3 marks)***



1. Use the graph to estimate the roots of . ***(2 marks)***
2. By drawing a suitable line on the graph solve the equation.

***(3 marks)***

1. A lorry left Malaba for Nairobi, 500 km away at 6.00 am and travelled at an average speed of 60km/h. After travelling for 1hour it stopped for 30 minutes to unload some luggage then proceeded with its average speed. A coast bus left Nairobi for Malaba at 8.00 am and travelled at an average speed of 90km/h. Calculate
2. The distance travelled by the lorry before the bus started its journey. ***(2 marks)***

1. The time of the day the two vehicles met ***(4 marks)***
2. How far from Malaba when they met. ***(3 marks)***
3. The time the bus reached Malaba if it travelled continuously without stopping.

***(1 mark)***

1. The table below shows measurements in metres made by a surveyor in her field book. (Distance are given in metres)

|  |  |  |
| --- | --- | --- |
| F 50  C 120 | B  280  250  200  150  100  40  A | E 40  D 100  B 50 |

1. Using the representative fraction scale of a map is , Draw the accurate measurements of the field

***(3 marks)***

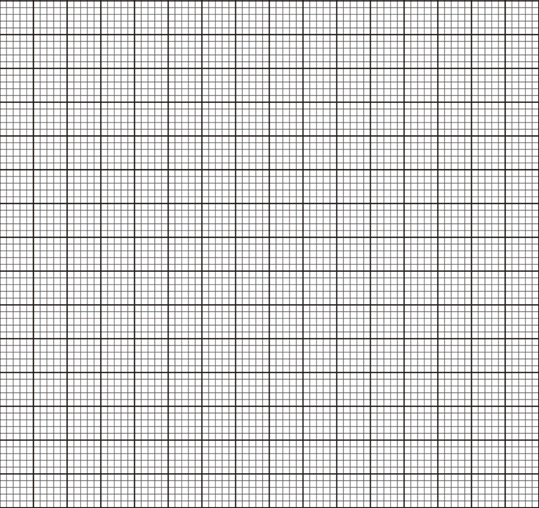
1. Calculate the area of the field in hectares ***(5 marks)***

Using the above scale:

1. Calculate actual circumference of the circular maize farm of radius 2.1cm on the map in kilometres. ***(2 marks)***
2. The table below shows the marks of 100 candidates in an examination:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Marks | 1-10 | 11-20 | 21-30 | 31-40 | 41-50 | 51-60 | 61-70 | 71-80 | 81-90 | 91-100 |
| No of students | 4 | 9 | 16 | 24 | 18 | 12 | 8 | 5 | 3 | 1 |

1. Draw a cumulative frequency curve to represent above data ***(3 marks)***



1. Using the graph determine:
2. the upper quartile ***(1 mark)***

1. estimate how many students passed, if 55 marks is the pass mark. ***(2 marks)***

1. find the pass mark if 70% of the students are to pass ***(2 marks)***

1. the range of marks obtained by the middle 80% of the students ***(2 marks)***

1. A ball is thrown upwards with a velocity of 40 m/s.

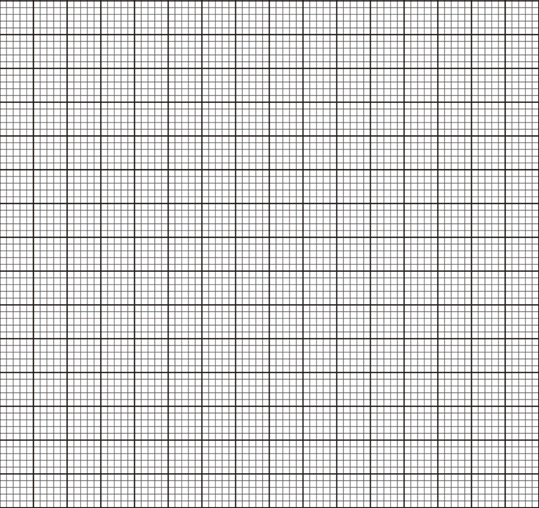
*( Take acceleration due to gravity to be )*

1. Determine the expression of its height above the point of projection ***(3 marks)***

1. Find the velocity and height after 2 seconds and 3 seconds ***(2 marks)***

1. Find the distance moved by the ball between and ***(2 marks)***

1. Find the maximum height attained by the ball. ***(3 marks)***
2. A transformation represented by the matrix maps P(0,0), Q(2,0), R(2,3) and S(0,3) onto P’, Q’, R’, S’
3. On the grid provided draw the quadrilateral PQRS and P’Q’R’S’ ***(3 marks)***



1. Determine the area of PQRS , Hence or otherwise find the area of P’Q’R’S’

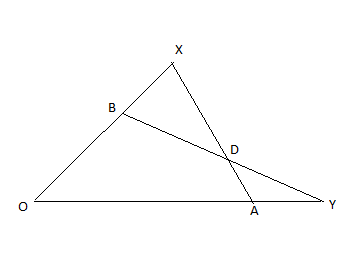
***(2 marks)***

1. A transformation represented by the matrixmaps P’Q’R’S’ onto P’’Q’’R’’S’’. On the same Cartesian plane draw and state the coordinates of P’’Q’’R’’S’’ ***(3 marks)***

1. Determine the matrix of transformation that would map P’’Q’’R’’S’’ onto PQRS

***(2 marks)***

1. In the figure below, and . If Y divides line OA in the ratio and



1. Find in terms of **a** and **b** the vectors:
2. **XA**  ***(1 mark)***

1. **BY**  ***(1 mark)***

1. If **XD**=*h***XA** and **BD**=*k***BY**, express OD in terms of
2. **a, b** and *h* ***(1 mark)***

1. ***a, b*** *and k* ***(1 mark)***

1. using the results in (b) above, find the values of *k* **and** *h* hence find***XD:DA***and***BD:DY. (6 marks)***