Name …………………………………………………………………………………..Admno……………………………………………………….

Class…………………………………………..Index no…………………………………………..………………….Date………………………

**121/1**

**MATHEMATICS**

**PAPER 1**

**MINI MOCK**

**TIME: 2½HOURS**

**MASTERCLASS INNER CIRCLE**

**CHAMPIONS LEADERSHIP INSTITUTE**

**121/1**

**MATHEMATICS**

**PAPER 1**

**MINI MOCK**

**TIME: 2½HOURS**

***INSTRUCTIONS TO CANDIDATE***

1. ***Write your name and index number in the spaces provided above.***
2. ***Sign and write the date of examination in the spaces provided.***
3. ***The paper contains two sections: Section I and II.***
4. ***Answer all questions in section I and only five questions from section II.***
5. ***All answers and working must be written on the question paper in the spaces provided below each questions.***
6. ***Show all the steps in your calculations, giving your answers at each stage in the spaces below each questions.***
7. ***Marks may be given for correct working even if the answer is wrong.***
8. ***Non-programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.***

**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** |

**SECTION I (50MARKS)**

Answer all questions in this section.

1. Evaluate ½ $\frac{3}{5}$ + ¼ 2$\frac{1}{3}$ - $\frac{3}{7}$ of 1½ $÷$5 (3mks)
2. (a) Express 22680 in terms of its prime factors. (1mk)

(b) Determine the smallest possible number **m** such that 22680m is a perfect square. (2mks)

1. On arrival in Kenya, a Canadian Tourist exchanged his Canadian Dollars for sh 199 690. Given that the currently exchange rate was

1 canadian dollar = ksh 52.55.

If the bank charged him 5% commission, find the number of dollar he exchanged. (3mks)

1. A regular polygon has 15 sides. If its interior angle is (a + 36)0, calculate the value of a. (3mks)
2. Simplify 27n2 – 12m2 (3mks)

 3n2 + 7mn – 6m2

1. Given that Cos 2x0 = Sin(x + 60)0, find tan (x + 10)0. (3mks)
2. A room measuring 540cm by 420cm has a floor covered by square tiles. Find in metres the length of the largest square tiles that can be used to cover the floor without requiring any cutting. (3mks)
3. Given that x:y = 2:3 and y:z = 1:5, find the value of $\frac{x-y}{2z + 5x }$ (3mks)
4. A metallic sphere is immersed in water in a cylindrical container. This causes a rise in the level of water by 7.5cm. if the cylindrical container has a base radius of 7cm, find the radius of the sphere to two s.f. (3mks)
5. A bus leaves town A at 8.30am and travels at an average speed of 70km/h. thirty minutes later, a car leaves the same town and follows the bus at 120km/h. find how far apart they will be at 9.30am. (3mks)
6. Find all the integral values of x which satisfy the inequality

3(1 + x) $<5x-11 <x+45$ (3mks)

1. The gradient function of a curve is 2x2 – x – 6. If it cuts the y-axis at y=3, find its equation. (4mks)
2. In the figure below, the equation of the line AB is 8y + 3x = 24. If the point B is equidistant from the x-axis and y-axis, find the co-ordinates of A and B. (3mks)

 y-axis

 B

 x-axis

 O

 A

1. Given that OP = 3i – 2j + k and OQ = 4i + I – 3k. Find the distance between the point p and Q to 3 significant figures. (3mks)
2. The table below is for the function y = x2 + 3.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | 0 | ½ | 1 | 1½ | 2 | 2½ | 3 | 3½ | 4 | 4½ | 5 | 5½ | 6 |
| y | 3 |  | 4 | 5.25 | 7 |  | 12 | 15.25 | 9 |  |  |  |  |

1. Complete the table. (1mk)
2. Use the mid ordinate rule with six ordinates to estimate the area bounded by the curve y=x2 + 3, the y- axis, the x-axis and the line x = 6. (3mks)
3. A two digit number is such that the one’s digit is four more than the tens digit and the sum of the digits is 14. Find the number. (3mks)

**SECTION II (50MARKS)**

1. (a) Using a ruler and a pair of compasses only construct a triangle PQR such that angle PQR = 1350, PQ= 7.4cm and QR = 8.5cm. (4mks)

(b) Given that the point T is equidistant from both PQ and QR and also from the point Q and R.

1. Locate T (3mks)
2. Find the area of triangle TQR. (3mks)
3. (a) Given that y=(2x - 3) (x-1)

Complete the table below (2mks)

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

(b) Use the table to draw the graph of y= (2x – 3) (x – 1) for -2$\leq x \leq 4$

1. Use your graph to solve the quadratic equations.
2. 2x2 = 5x – 3 (2mks)
3. 2x2 -3x – 2= 0 (3mks)
4. OACB is a parallelogram in which E divides AC in the ratio 3:2 and D is a point on BC produced such that BC: CD = 3:2.
5. Given that OA = a and OB = b, express in term of a and b
6. OE
7. OD
8. Hence show that O, E and D are collinear. (4mks)
9. Given further that angle OBD is obtuse, angle ODB = 250, OD = 6cm and OB= 3.5cm. Calculate BD. (4mks)
10. (a) In the figure below O is the centre of a circle whose radius is 5cm. AB = 8cm and angle AOB is obtuse.

 A B

 8cm

1. Calculate the obtuse angle AOB. (2mks)
2. Calculate the area of the major segment. (5mks)

(b) A wheel rotates at 300 revolutions per minute. Calculate the angle in radians through which a point on the wheel turns in one second. (3mks)

1. A particle starts from a point O and moves in a straight line. Its velocity vm/s is given by V= t2 – 3t + 2, where t is the time in seconds. Find
2. i. The velocity when t = 3 (2mks)

ii.The displacement when t = 3 (3mks)

iii.The acceleration when t = 3 (2mks)

1. At what instant is the particle momentanly at rest. (3mks)
2. A triangle plot ABC is such that AB = 36m, BC= 40m and AC = 42m.
3. Calculate to 1 d.p. the
4. Area of the plot in square metres. (4mks)
5. A cute angle between the edges AB and BC. (4mks)
6. A water tap is to be installed inside the plot such that the tap is equidistant from each of the vertices A, B and C. Calculates the distance of the tap from vertex A. (2mks)
7. (a) Find a quadratic equation with integral coefficients whose roots are 2 + $\sqrt{5 }$ and 2 - $\sqrt{5 }$. (4mks)

(b) Simplify (a + $\frac{1}{a}$)2 - (a - $\frac{1}{a}$)2 (4mks)

(c) Factorise ab – 2ac – 6c + 3b (2mks)

1. The following are the marks obtained by 40 pupils in a Mathematics test.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 14 | 10 | 6 | 9 | 7 | 15 | 10 | 13 | 11 | 7 |
| 8 | 11 | 10 | 12 | 8 | 7 | 11 | 12 | 7 | 6 |
| 7 | 10 | 10 | 11 | 10 | 9 | 10 | 9 | 13 | 12 |
| 9 | 13 | 9 | 7 | 11 | 11 | 8 | 12 | 8 | 10 |

1. Using a class width of 5, and starting with the least mark make a frequency distribution for the data. (3mks)
2. Calculate the mean mark. (4mks)
3. On the graph provided, draw a frequency polygon for the data. (3mks)