**MINEDUC . DATE: 10-04-2020**

**KICUKIRO DISTRICT.**

**NYARUGUNGA SECTOR . CLASSES S6 ( MPC, MCB, PCM and MEG)**

**ECOLE SECONDAIRE KANOMBE/EFOTEC.**

**MATHEMATICS QUESTIONS RELATED TO SINIOR FOUR CLASSES**

 **PAPER 2**

**Q1**.find the value of for which the equation  has repeated roots

**Q2**.write the circle  in the standard form of , by determining the exact value of and 

**Q3**.in the equation below represents the total revenue and is a function of where represents the number of units sold.

1. Find the marginal revenue function
2. Find the marginal cost of 

**Q4**. Three point A, B and C are such that ,  and , by how many units does the length ofexceed the length of ?

**Q5**.prove that the line is tangent to the circle whose equation is given

 By and then find the point of intersection.

**Q6**. A ship travels a course, the ship travels until it is due north of the port which is 

 due East of the port from where the ship originated. How far did he travel?

**Q7**.find the equation of the two straight lines that make an angle of  with the line 

 and that passes through the point 

**Q8**.let consider the equation  defined in , find the value of the constant and  such that: ,hence state how does the result you get called?

**Q9**.given the following equation of circles, , and 

1. Prove that the second circle is orthogonal to the third circle
2. Find the relationship between between the first circle and the following lines
3. 
4. 
5. , by comparing the distance of the line to the center of the circle with the radius of the circle.

**Q10**.the volume of the cube is increasing at the rate of .how fast is its surface area increasing, when the length of the edge is ?

**Q11**.consider the quadratic function  such that , where and are first and second derivative respectively. Determine 

**Q12.**let consider the following grouped data

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| Classes |  |  |  |  |  |  |  |
| Frequency | 1 | 8 | 10 | 9 | 8 | 4 | 2 |

1. Copy and complete the following table

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Where  is the mid class of the distribution

1. Calculate the mean of the distribution defined by:
2. Find the variance of the distribution denoted by :
3. Calculate the standard deviation of the distribution denoted by :
4. Hence or otherwise determine the coefficient of variation denoted by: 

**Q13**. A Stereo manufacture determines that in order to sell units of a new stereo, the price per unit in dollars must be  . The manufacture also determines that the total cost producing units is given by 

1. Find the total revenue 
2. Find the total profit 
3. How many units must the company produce and sell in order to maximize the profit?
4. What is the maximum profit
5. What price per unit must be charged in order to make this maximum profit?

**Q13**. Let consider the function 

1. Write the domain of definition of 
2. Calculate the limit on the boundaries of the domain
3. If , determine the value of and , hence , determine all possible asymptote corresponding to the curve of .
4. Find the intercept points with coordinate axis
5. By means of first derivative ,state which one of the point  and  is maximum or minimum, and write the increase and decrease interval for 
6. Study the parity of the function , hence sketch the curve

**Q15**.a basket contain eleven tickets numbered from 1 to 11. One ticket is drawn randomly without replacing itand its number is noted, Let A be the event that: **“the number is a multiple of 2”** and B be the event that:  **“ the number is a multiple of 3”**

1. Show that A and B are not independent event
2. Find and 
3. Find and 

**Q16**.solve the following equation in the set or real numbers where! Means factorial

1.  b)  c)

**Q17**. Use combination theory to solve the following problems

1. A group of books containing 4mathematics books and 5 physics books is chosen from 9 mathematics books and 10physics books. How many books can be formed?
2. Find the value of if the coefficient of in the expansion of is twice the coefficient of . **HINT: use the formula **

**Q18.** Solve the following equation or simultaneous equations in the set of real numbers

1. 
2. 

**Q19**.an inverted cone with a vertical angle of is collecting water leaking from a tap at the rate of if the height of the water collected in the cone is , find the rate at which the surface area of water is increasing .

* **HINT: volume of cone is , surface area is , hence **
* ** And ** are formula of rate of change, others are derivative of the above formulas.

**Q20**.a container in the shape of a hallow cone with a semi vertical angle of is held with its vertex pointing down ward. Water is poured into the cone at the rate of .find the rate at which the depth of water in the cone is increasing when the height (depth) is .

**Q21**.In how many ways can the word **AMAFARANGA** be written if:

1. there is no restriction
2. the vowels are adjacent (collected together to form one letter)
3. the consonant are adjacent
4. if event A represent adjacent vowels and event B represent adjacent consonant , find their respective probabilities.

**Q22**.write the tangent line corresponding to the curve defined by  which is parallel to the line defined by the equation , hence write the corresponding normal equation.

**Q23.**given that, discuss the continuity of the function at , by stating the condition necessary for a function to be continuous at a given value

**Q24.**a volleyball team is to be selected from a group of 5 boys and 4 girls, in how many ways can that be done if:

1. there is no restriction ( no condition)
2. there should be more boys than girls
3. find the probability that:
4. there must be more boys than girls
5. there must be more girls than boys
6. there must be girls or boys only

**Q25**.the event A and B are independent and they are such that and 

1. find the value of 
2. for that value of , determine
3. 
4. 