MINEDUC . **DATE: 30-06-2020**
KICUKIRO DISTRICT.
NYARUGUNGA SECTOR . **CLASSES S_6 (MPC, MCB,PCM and MEG)**
ECOLE SECONDAIRE KANOMBE/EFOTEC.
MATHEMATICS QUESTIONS RELATED TO SINIOR FIVE CLASSE

Paper I

Q1. By expanding $\sin(2x+x)$ and using double angle formulae, show that $\sin 3x = 3\sin x - 4\sin^3 x$

Q2.let $A = 4\sin^2 x + 2\cos^2 x - 3$ with $x \in]-\pi, \pi[$

a) Express A in terms of $\cos x$

b) Determine the value of x for $A = \frac{1}{2}$

Q3.given that $M = \sin(x - 60^0) - \cos(30^0 - x) = 1$

a) Show that M can be written in the form of $\cos x = k$, where k is a constant

b) Solve the equation of M for $0^0 \le x \le 180^0$

Q4.find the period of the function $f(x) = \tan\left(4\pi^2 x - \frac{\pi}{3}\right)$

Q5.solve the following quadratic trigonometric function

a) $4\sin^2\left(\frac{t}{3}\right) - 3\sin\left(\frac{t}{3}\right) = 1$

b) $\cos^2 x - \sin^2 x + \sin x = 1$ **(HINT:** $\cos^2 x = 1 - \sin^2 x$**)**

c) $\sin^2\theta - \cos^2\theta = 1 + \cos\theta$ **(HINT:** $\sin^2\theta = 1 - \cos^2\theta$**)**

d) $\tan^2 x - 3\tan x + 1 = 0$

Q6.for each of the following trigonometric and inverse trigonometric function find $\frac{dy}{dx}$

a) $y = x^2 - 2\sin 2x$

b) $x = 4\sin(2y+6)$ and

c) $y = \tan^{-1}\left(\sqrt{x^2+1}\right)$

Q7.given that $f(x) = -1 + \tan^{-1}\left(\frac{4x}{5}\right)$

a) Write x in terms of y and hence

b) Find the inverse $f^{-1}(x)$ the function of $f(x)$

Q8.transform

a) The sum $\sin 4x + \sin 5x$ in product

b) The product $\sin x \sin 2x$ in sum

Q9. Consider the function $f(x) = \sin^{-1}(x+2)$

a) Find the domain of definition and hence interpret the result on the number line

b) Determine the value of x for which $f(x) = \frac{\pi}{6}$

Q10. Prove that the parametric equation $\begin{cases} x = a + r\cos\theta \\ y = b + r\sin\theta \end{cases}$ is an equation of circle of center $C(a,b)$ and of radius r

Q11.By transforming the trigonometric equation $a\cos x + b\sin x = c$ into $\sqrt{a^2+b^2}\cos(x-\theta) = c$ **where** $\theta = \tan^{-1}\left(\frac{b}{a}\right)$

Solve the following trigonometric equation

a) $\cos x + \sqrt{3}\sin x = \sqrt{3}$

b) $\sqrt{3}\cos x + \sin x = 1$

Q12.The sum of the second and the third term of a geometric sequence is 12.the sum of the first and the fourth term of the same sequence is -36. Find the first term and the common ratio.

Q13.consider the two sequence U_n and V_n given by $U_0 = 9$, $U_{n+1} = \frac{1}{2}U_n - 3$ and $V_n = U_n + 6$

a) Show that V_n is a geometric sequence

b) Express $S_n = V_0 + V_1 + V_2 + .. + V_n$ in terms of n

Q13.the arithmetic mean between two numbers is 34 and their geometric mean is 16, find the two numbers?

Q14.The sum of the first ten terms of an arithmetic sequence is 25, and the sum of its first twenty terms is 290.find the common difference and the first term of the arithmetic sequence.

Q15.The sequence V_n is defined as follow $\ln(7^n V_n) = 2n$

a) Write V_n in terms of n variable

b) Find V_0, V_1, V_2

c) Show that V_n is a geometric sequence by determining the common rato

Q16.insert:

a) 4 geometric mean between 4 and 128

b) 6arithmetic mean between 3 and 24

Remember that $a = \sqrt[k+1]{\frac{b}{a}}$ **is the new common ratio and** $d = \frac{b-a}{n+1}$ **is the new common difference, where a and b are first and last term respectively.**

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