MATH 002 (CODE 001)

PART-I Multiple Choice

1. Which of the following statements in True: (3 points each)

(a) If $45^0 < x < 90^0$, then $\cos 3x$ is negative.

(b) $\tan 2 > \tan 1$, (angles in radians).

(c) The range of $y = \sin x$ is the open interval $(-1,1)$.

(d) If $45^0 < x < 90^0$, then $\cot 2x$ is positive

2. If $\sec x = \frac{-3}{2}$ and $\tan x = \frac{\sqrt{5}}{2}$, then $\csc x$ is equal to:

(a) $-\frac{3}{\sqrt{5}}$

(b) $\frac{\sqrt{5}}{3}$

(c) $\frac{3}{\sqrt{5}}$

(d) $-\frac{\sqrt{5}}{3}$

3. If $f(x)$ is a function such that $f\left(x+\frac{1}{2}\right) = f(x)$ for all x in the domain of f, then

(a) $f(x)$ is a periodic function of period $\frac{1}{2}$.

(b) $f(x)$ is not a periodic function.

(c) $f(x)$ is a periodic function of period 2.

(d) $f(x)$ is a periodic function of period $\frac{p}{2}$.

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4. hich of the follo wing equat ions is False

(a) tan(*A*

(b)

sin 2 *x*

(c)

tan (*A*

.

(d) $\tan(A+B) = \dfrac{1}{\cot(A+B)}$.

5. Which of the following statements is impossible:

(a) $\sin^2\left(\dfrac{q}{2}\right) + \cos^2\left(\dfrac{q}{2}\right) = \dfrac{1}{2}$.

(b) $\sec x = e^2$.

(c) $\cos b = \dfrac{3}{p}$.

(d) If $0^0 < a < 90^0$, then $\tan a > \sin a$.

2. Using the adjacent figure, find $a, b,$ and c if

(8 points)

PART-II Written Questions

1. If the point $\left(-1, \dfrac{3}{4}\right)$ lies on the terminal side of angle q in standard position, then find the exact values of

(a) $\sin(-q)$. (3 points)

(b) $\tan\left(\dfrac{p}{2} - q\right)$ (4 points)

3. (a) Verify the following identity: $\frac{1-\tan^2 B}{1+\tan^2 B} = \cos 2B.$ (5 points)

(b) (i) Determine which quadrant contains the point $P(16)$ that lies on the unit circle. (2 points)

(ii) Using (i), Find the sign of $\sin(16)$ (2 points)

4. (a) Evaluate $\tan\left(\frac{-34\pi}{6}\right)$ (5 pts.)

(b) Find K if $[K-1,\ 3K+4]$ is the range of a periodic function of amplitude $\left(\frac{7}{2}\right)$. (6 pts.)

5. Find an equation of the form $y = a\cos(bx+c)$ that has the given graph. (6 points)

6. If $\cos(-q) = \frac{-1}{\sqrt{5}}$, and $\csc q < 0$, then evaluate $\cos 3q$. (9 points)

7. (a) Apply the reduction identity $a\cos q + b\sin q = \sqrt{a^2 + b^2}\sin(q + a),\ (q + a),\ 0 \le a < 2p$ on the function $y = \sqrt{3}\sin 4x - \cos 4x$ to find its

(1) amplitude

(2) period

(3) phase shift

(4) range

8. Find all values of x in the interval $[0, p)$ for which $2\cos 3x - 2\sec 3x + 3 = 0$. (9 points)

9. (a) Find the exact value of $\sin 75^0$. (5 points)

(b) If $\cot A = \frac{2}{\sqrt{5}}$, and $\cos A < 0$, then find $\cos \frac{A}{2}$. (4 points)

9. (A) Let $f(x) = 2\tan\left(\frac{x}{2} - \frac{\pi}{2}\right)$, find

(a) x-intercepts of f over the given interval. (2 points)

(b) y-intercept of f over the given interval. (1 point)

(c) all vertical asymptote over the given interval (1 point)

(d) the range of f. (1 point)

(B) Using parts (a), (b), (c) and (d), sketch the graph of $f(x)$ over $(-2\pi, 2\pi)$. (3 points)