

PART-I Multiple Choice

1. Which of the following statements is True: each)

(3 points)

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

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(a) If $45^\circ < x < 90^\circ$, 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 $45^\circ < x < 90^\circ$, 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) $-\frac{\sqrt{5}}{3}$

4. Which of the following equations is False

(a) $\tan(A$

(b)

$\sin 2A$

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)

$\tan(A$

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

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

5. Which of the following statements is impossible:

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

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

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

$$(d) \quad \text{If } 0^\circ < a < 90^\circ, \text{ then } \tan a > \sin a.$$

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

(8 points)

PART-II Written Questions

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

$$(a) \quad \sin(-q). \quad (3 \text{ points})$$

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

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 $\tan\left(\frac{-34\mathbf{p}}{6}\right)$ (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 $a \cos q + b \sin q = \sqrt{a^2 + b^2} \sin(q + a)$, $(q + a)$, $0 \leq a < 2\pi$ 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 $[0, \pi)$ for which $2 \cos 3x - 2 \sec 3x + 3 = 0$.

(9 points)

9. (a) Find the exact value of $\sin 75^\circ$.

(5 points)

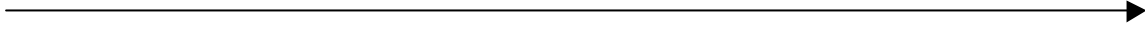
(b) If $\cot A = \frac{2}{\sqrt{5}}$, and $\cos A < 0$, then find $\cos \frac{A}{2}$.

(4 points)

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

(3 points)

