Precalculus

Topic: Trigonometric Functions of Real Numbers

Instructions

Solve the following problems related to trigonometric functions of real numbers. Show all work clearly and check your solutions.

Practice Problems

1. **Evaluate the following trigonometric functions for real numbers:**

   (i) $\sin\left(\frac{\pi}{6}\right)$
   (ii) $\cos\left(\frac{\pi}{4}\right)$
   (iii) $\tan\left(\frac{\pi}{3}\right)$
   (iv) $\sin\left(\frac{\pi}{2}\right)$
   (v) $\cos\left(\frac{\pi}{3}\right)$
   (vi) $\tan\left(\frac{\pi}{2}\right)$
   (vii) $\sin(2\pi)$
   (viii) $\cos\left(\frac{3\pi}{2}\right)$

2. **Find the exact values of the following trigonometric functions:**

   (i) $\sin\left(\frac{5\pi}{6}\right)$
   (ii) $\cos\left(\frac{5\pi}{4}\right)$
   (iii) $\tan\left(\frac{7\pi}{6}\right)$
   (iv) $\sin\left(\frac{\pi}{4}\right)$
   (v) $\cos\left(\frac{\pi}{3}\right)$
   (vi) $\tan\left(\frac{\pi}{2}\right)$
   (vii) $\sin\left(\frac{\pi}{3}\right)$
   (viii) $\cos\left(\frac{\pi}{6}\right)$

3. **Find the values of the following trigonometric functions for $t = \frac{\pi}{3}, \frac{\pi}{4}, \frac{\pi}{6}$:**

(i) $\sin(t)$
(ii) $\cos(t)$
(iii) $\tan(t)$

4. **Find the values of the trigonometric functions for t from the given information:**

(i) $\sin t = \frac{3}{5}$, terminal point of t is in Quadrant II
(ii) $\cos t = -\frac{4}{5}$, terminal point of t is in Quadrant IV
(iii) $\sec t = 3$, terminal point of t is in Quadrant II
(iv) $\sin t = \frac{1}{2}$, terminal point of t is in Quadrant I
(v) $\tan t = -\frac{3}{4}$, $\cos t > 0$
(vi) $\sec t = -2$, $\sin t < 0$
(vii) $\sin t = \frac{1}{\sqrt{2}}$, $\sec t < 0$
(viii) $\tan t = -4$, $\csc t < 0$

5. **Determine whether the function is even, odd, or neither:**

(i) $f(x) = x^2 \sin x$
(ii) $f(x) = x^2 \cos 2x$
(iii) $f(x) = \sin x \cos x$
(iv) $f(x) = |x| \cos x$
(v) $f(x) = x^3 + \cos x$
(vi) $f(x) = \cos x$
(vii) $f(x) = x \sin^3 x$
(viii) $f(x) = \cos(\sin x)$

Multiple-Choice Questions

1. What is the value of $\sin\left(\frac{\pi}{4}\right)$?

A. $\frac{\sqrt{2}}{2}$
B. 1
C. $\frac{1}{2}$
D. 0

2. What is the value of $\cos\left(\frac{\pi}{3}\right)$?

A. 1
B. $\frac{1}{2}$
C. 0
D. $\frac{\sqrt{2}}{2}$

3. What is the value of $\tan\left(\frac{\pi}{6}\right)$?

A. $\frac{\sqrt{3}}{3}$
B. 1
C. $\frac{1}{\sqrt{3}}$
D. 0