Solving Trigonometric Equations - Part 1

Problem 1:

\[ \sin x = \frac{\sqrt{2}}{2} \]

Solve for \( x \) on the interval \([0, 2\pi)\). Express your answers in **exact** radians.

Problem 2:

\[ \sin x = -\frac{\sqrt{2}}{2} \]

Solve for \( x \) on the interval \([0, 2\pi)\). Express your answers in **exact** radians.

Problem 3:

\[ \tan x = \sqrt{3} \]

Solve for \( x \) on the interval \([0, 2\pi)\). Express your answers in **exact** radians.

Problem 4:

\[ \tan x = -\sqrt{3} \]

Solve for \( x \) on the interval \([0, 2\pi)\). Express your answers in **exact** radians.

Problem 5:

Let's solve \( \tan x = -\sqrt{3} \) for \( x \) again, however, this time on the interval \([-\frac{\pi}{2}, \frac{\pi}{2})\). Be sure to express your answer in **exact** radians.
Problem 6:

\[ \cos x = \frac{\sqrt{3}}{2} \]
Solve for \( x \) on the interval \([0^\circ, 360^\circ]\). Express your answers in degrees.

Problem 7:

Solve \( \cos x = -0.67 \) for \( x \) on the interval \([0, 2\pi]\). Express your answers in radians.

Problem 8:

Solve \( \sin x = 0.15 \) for \( x \) on the interval \([0, 2\pi]\). Express your answers in radians.

Problem 9:

Solve \( \tan x = -0.45 \) for \( x \) on the interval \([0, 2\pi]\). Express your answers in radians.

Problem 10:

Solve \( \cos x = 0.37 \) for \( x \) on the interval \([0^\circ, 360^\circ]\). Express your answers in degrees.

Problem 11:

Solve \( \sin x = 1 \) for \( x \) on the interval \([0^\circ, 720^\circ]\). Express your answers in degrees.

Problem 12:

Solve \( \cos x = 0 \) for \( x \) on the interval \([0^\circ, 360^\circ]\). Express your answers in degrees.
1.  
\[ x_1 = 45^\circ \equiv \frac{\pi}{4} \]
\[ x_2 = 180^\circ - 45^\circ = 135^\circ \equiv \frac{3\pi}{4} \]

4.  
\[ x_1 = 120^\circ \equiv \frac{2\pi}{3} \]
\[ x_2 = 300^\circ \equiv \frac{5\pi}{3} \]

2.  
\[ x_1 = 225^\circ \equiv \frac{5\pi}{4} \]
\[ x_2 = 315^\circ \equiv \frac{7\pi}{4} \]

5.  
\[ x = -60^\circ \equiv -\frac{\pi}{3} \]

6.  
\[ x_1 = 30^\circ \]
\[ x_2 = 330^\circ \]

7.  
\[ x_1 \approx 2.31 \]
\[ x_2 \approx \pi + 0.83 = 3.97 \]

8.  
\[ x_1 \approx 0.15 \]
\[ x_2 \approx \pi - 0.15 = 2.99 \]

9.  
\[ x_1 \approx \pi - 0.42 = 2.72 \]
\[ x_2 \approx 2\pi - 0.42 = 5.86 \]

10.  
\[ x_1 \approx 68.28^\circ \]
\[ x_2 \approx 360^\circ - 68.28^\circ = 291.72^\circ \]

11.  
\[ x_1 = 90^\circ \]
\[ x_2 = 360^\circ + 90^\circ = 450^\circ \]

12.  
\[ x_1 = 90^\circ \]
\[ x_2 = 270^\circ \]