Section 6.3: Solving Trigonometric Equations II

I. Equations with Half Angles

Example 1: Solve $2\cos\frac{x}{2}-\sqrt{2}=0$

a) over the interval $[0,2\pi)$

b) for all solutions.

Practice: Solve the equation $2\sqrt{3}\sin\frac{x}{2}=3$:

a) over the interval $[0,2\pi)$

b) for all solutions.

II. Equations with Multiple Angles

Example 2: Solve the equation $\cos 2x = \sin x$ over the interval $[0, 2\pi)$.

Practice: Solve $\sin x = \sin 2x$ over the interval $[0, 360^\circ)$.

Example 3: Solve $2\cos^2 x - 2\sin^2 x + 1 = 0$

a) over the interval $[0, 2\pi)$.

b) for all solutions.

- **Note:** Be aware that an expression of the form $y = \sin ax$ or $y = \cos ax$ could have as many as $2a$ solutions in the principal intervals of $[0, 2\pi)$ and $[0, 360^\circ)$. ***Wow, that's a lot of solutions!***

Practice: Solve the equation $\cot 2x - \csc 2x = 1$ over the interval $[0, 2\pi)$.