

Warm-up : (coterminal angles)

$$\textcircled{1} \quad \frac{\pi}{6} + 2\pi \cdot \frac{6}{6} = \frac{13\pi}{6}$$

$$\textcircled{2} \quad \frac{5\pi}{3} + 2\pi = \frac{11\pi}{3}$$

$$\textcircled{3} \quad \frac{7\pi}{4} + 2\pi = \frac{15\pi}{4}$$

SOLVING TRIG EQUATIONS

WITH MULTIPLE ANGLES

SOLVE OVER $[0, 2\pi)$.

• $6 \sin(2x) - 3 = 0$

$$\begin{aligned} \sin(2x) &= \frac{3}{6} && \left. \begin{array}{l} \text{isolate trig function} \\ \sin(2x) = \frac{1}{2} \end{array} \right\} \\ \sin(2x) &= \frac{1}{2} && \frac{1}{2} 2x = \frac{\pi}{6} \cdot \frac{1}{2} \end{aligned}$$



$$\textcircled{1} \quad 2x = \frac{\pi}{6}, \frac{5\pi}{6} \\ \quad \quad \quad +2\pi \quad +2\pi$$

$$\textcircled{2} \quad 2x = \frac{13\pi}{6}, \frac{17\pi}{6}$$

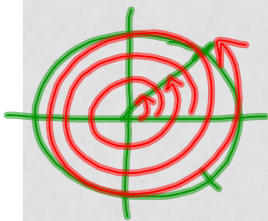
$$x = \frac{\pi}{12}, \frac{5\pi}{12}, \frac{13\pi}{12}, \frac{17\pi}{12}$$

SOLVE OVER $[0, 2\pi)$.

• $\sec(3x) = \sqrt{2}$

$$\cos(3x) = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$$

$$\cos(3x) = \frac{\sqrt{2}}{2}$$



① $3x = \frac{\pi}{4}, \frac{7\pi}{4}$
 $+2\pi \quad +2\pi$

② $3x = \frac{9\pi}{4}, \frac{15\pi}{4}$
 $+2\pi \quad +2\pi$

③ $3x = \frac{17\pi}{4}, \frac{23\pi}{4}$

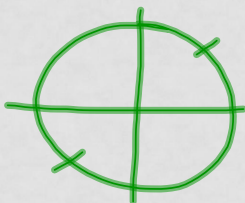
$x = \frac{\pi}{12}, \frac{7\pi}{12},$
 $\frac{3\pi}{4}, \frac{5\pi}{4},$
 $\frac{17\pi}{12}, \frac{23\pi}{12}$

SOLVE OVER $[0, 2\pi)$.

• $5 \tan(4x) - 5 = 0$

$$\tan(4x) = 1 = \frac{1}{1}$$

$$\frac{\sin(4x)}{\cos(4x)} = \frac{\sqrt{2}/2}{\sqrt{2}/2} \text{ OR } \frac{-\sqrt{2}/2}{-\sqrt{2}/2}$$



① $4x = \frac{\pi}{4}, \frac{5\pi}{4}$

② $4x = \frac{9\pi}{4}, \frac{13\pi}{4}$

③ $4x = \frac{17\pi}{4}, \frac{21\pi}{4}$

④ $4x = \frac{25\pi}{4}, \frac{29\pi}{4}$

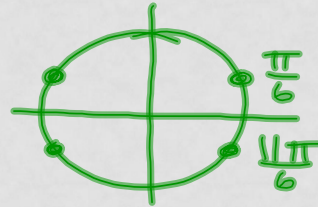
$x =$
 $\frac{\pi}{16}, \frac{5\pi}{16}, \frac{9\pi}{16},$
 $\frac{13\pi}{16}, \frac{17\pi}{16},$
 $\frac{21\pi}{16}, \frac{25\pi}{16}, \frac{29\pi}{16}$

SOLVE OVER $[0, 2\pi)$.

• $\cot^2(2x) = 3$

$$\cot(2x) = \pm\sqrt{3}$$

$$\frac{\cos(2x)}{\sin(2x)} = \pm \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}}$$



① $2x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

② $2x = \frac{13\pi}{6}, \frac{17\pi}{6}, \frac{19\pi}{6}, \frac{23\pi}{6}$

$x = \frac{\pi}{12}, \frac{5\pi}{12}, \frac{7\pi}{12}, \frac{11\pi}{12}, \frac{13\pi}{12}, \frac{17\pi}{12}, \frac{19\pi}{12}, \frac{23\pi}{12}$