

Solve for $x \in [0, 2\pi)$

$$1. 4\sin x \cos^2 x - 3\sin x = 0$$

$$\sin x (4\cos^2 x - 3) = 0$$

$$\sin x = 0$$

$$4\cos^2 x - 3 = 0$$

$$\cos^2 x = \frac{3}{4}$$

$$\cos x = \pm \frac{\sqrt{3}}{2}$$

$$x = 0, \pi$$

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

$$2. (\sin x - \cos x)^2 = (1)^2$$

$$\sin^2 x - 2\sin x \cos x + \cos^2 x = 1$$

$$1 - 2\sin x \cos x = 1$$

$$-2\sin x \cos x = 0$$

$$\sin x \cos x = 0$$

$$\sin x = 0$$

$$\cos x = 0$$

$$x = 0, \pi$$

$$x = \frac{\pi}{2}, \frac{3\pi}{2}$$

$x = 1$ v.
 $x^2 = 1$
 squaring
 both sides
 may introduce
 extraneous
 solutions

$$3. \cos(4x) = \frac{1}{\sqrt{2}}$$

$$0 \leq x < 2\pi$$

$$4x = \frac{\pi}{4}, \frac{7\pi}{4}, \frac{9\pi}{4}, \frac{15\pi}{4}, \frac{17\pi}{4}, \frac{23\pi}{4}$$

$$0 \leq 4x < 8\pi$$

$$2\pi = \frac{8\pi}{4}$$

$$x = \frac{\pi}{16}, \frac{7\pi}{16}, \frac{9\pi}{16}, \frac{15\pi}{16}, \frac{17\pi}{16}, \frac{23\pi}{16}, \frac{25\pi}{16}, \frac{31\pi}{16}$$

$$\tan(5x) = 0$$

$$0 \leq x < 2\pi$$

$$0 \leq 5x < 10\pi$$

$$5x = 0, \pi, 2\pi, 3\pi, 4\pi, 5\pi, 6\pi, 7\pi, 8\pi, 9\pi$$

$$x = 0, \frac{\pi}{5}, \frac{2\pi}{5}, \frac{3\pi}{5}, \frac{4\pi}{5}, \pi, \frac{6\pi}{5}, \frac{7\pi}{5}, \frac{8\pi}{5}, \frac{9\pi}{5}$$

6.6 handout Solve for $x \in [0, 2\pi)$.

$$72. \cos 2x = 2\cos x - 1$$

$$\cancel{2\cos^2 x - 1} = \cancel{2\cos x - 1}$$

$$\cos^2 x = \cos x$$

$$\cos^2 x - \cos x = 0$$

$$\cos x (\cos x - 1) = 0$$

$$\cos x = 0$$

$$\cos x - 1 = 0$$

$$x = \frac{\pi}{2}, \frac{3\pi}{2}$$

$$\cos x = 1$$

$$x = 0$$

$$74. \sin 4x - \cos 2x = 0$$

$$\sin 2(2x) - \cos 2x = 0$$

$$2\sin 2x \cos 2x - \cos 2x = 0$$

$$\cos 2x (2\sin 2x - 1) = 0$$

$$\cos 2x = 0$$

$$2\sin 2x - 1 = 0$$

$$2x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \frac{7\pi}{2}$$

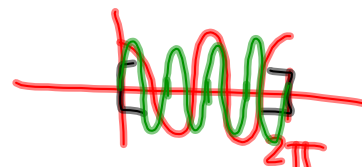
$$\sin 2x = \frac{1}{2}$$

$$2x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{13\pi}{6}, \frac{17\pi}{6}$$

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

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

$$\sin 4x = \cos 2x$$



$$78. \quad \cos 2x \cos x - \sin^2 x \sin x = 0$$

$$\cos(2x + x) = 0$$

$$\cos 3x = 0$$

$$3x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \frac{7\pi}{2}, \frac{9\pi}{2}, \frac{11\pi}{2}$$

$$x = \frac{\pi}{6}, \frac{\pi}{2}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{3\pi}{2}, \frac{11\pi}{6}$$

$$82. \quad \cos 3x + \cos x = 0$$

$$\cos(2x + x) + \cos x = 0$$

$$\cos 2x \cos x - \sin^2 x \sin x + \cos x = 0$$

$$(\cos^2 x - \sin^2 x) \cos x - (2 \sin x \cos x) \sin x + \cos x = 0$$

$$\cos^3 x - \sin^2 x \cos x - 2 \sin^2 x \cos x + \cos x = 0$$

$$\cos^3 x - 3 \sin^2 x \cos x + \cos x = 0$$

$$\cos^3 x - 3(1 - \cos^2 x) \cos x + \cos x = 0$$

$$\cos^3 x - 3 \cos x + 3 \cos^3 x + \cos x = 0$$

$$4 \cos^3 x - 2 \cos x = 0$$

$$2 \cos x (2 \cos^2 x - 1) = 0$$

$$2 \cos x = 0 \quad 2 \cos^2 x - 1 = 0$$

$$\cos x = 0$$

$$\cos^2 x = \frac{1}{2}$$

$$x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$$

84. $2\sin x \cos x - 2\sqrt{2}\sin x - \sqrt{3}\cos x + \sqrt{6} = 0$

$2\sin x (\cos x - \sqrt{2}) - \sqrt{3}(\cos x - \sqrt{2}) = 0$

$(\cos x - \sqrt{2})(2\sin x - \sqrt{3}) = 0$

$\cos x - \sqrt{2} = 0$

$\cos x = \sqrt{2}$
 no solution

none
 $-1 \leq \cos x \leq 1$

$2\sin x - \sqrt{3} = 0$

$\sin x = \frac{\sqrt{3}}{2}$

$x = \frac{\pi}{3}, \frac{2\pi}{3}$

76. $\tan \frac{x}{2} = 1 - \cos x$

$\tan \frac{x}{2} = \frac{1 - \cos x}{\sin x}$

$= \frac{\sin x}{1 + \cos x}$

$\frac{\sin x}{1 + \cos x} = (1 - \cos x)$

$\sin x = 1 - \cos^2 x$

$\sin x = \sin^2 x$

$0 = \sin^2 x - \sin x$

$0 = \sin x (\sin x - 1)$

$\sin x = 0$
 $x = 0, \pi$

$\sin x = 1$
 $x = \frac{\pi}{2}$

6.6 handat
 1-21 odd

61-69 odd

71-83 odd