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

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

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

$\sin 2x$

1

$1 - \sin 2x = 1$

$0 = \sin 2x$

$2x = 0, \pi, 2\pi, 3\pi$

$x = 0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}$ ~~2π~~ ~~$\frac{3\pi}{2}$~~

★ raising both sides of an equation to an even power may introduce extraneous solutions!

$0 \le x < 2\pi$

$0 \le 2x < 4\pi$

check:

$\sin 0 - \cos 0 = 0 - 1 = -$

$\sin\frac{\pi}{2} - \cos\frac{\pi}{2} = 1 - 0 =$

$\sin\pi - \cos\pi = 0 - (-1) =$

$\sin\frac{3\pi}{2} - \cos\frac{3\pi}{2} = -1 - 0 = -$

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

$0 \le x < 2\pi$

$0 \le 4x < 8\pi$

$4x = \frac{\pi}{4}, \frac{7\pi}{4}, \frac{9\pi}{4}, \frac{15\pi}{4}, \frac{17\pi}{4}, \frac{23\pi}{4}, \frac{25\pi}{4}, \frac{31\pi}{4}$

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

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

$\tan(5x) = 0$

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

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

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

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

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

$\cos^2 x = \cos x$

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

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

$\cos x = 0, \quad \cos x = 1$

$x = \frac{\pi}{2}, \frac{3\pi}{2}, 0$

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

$\sin 2(2x)$

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

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

$\cos 2x = 0$, $\sin 2x = \frac{1}{2}$

$2x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \frac{7\pi}{2}$ $\quad 2x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{13\pi}{6}, \frac{17\pi}{6}$

$x = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$ $\quad x = \frac{\pi}{12}, \frac{5\pi}{12}, \frac{13\pi}{12}, \frac{17\pi}{12}$

78. $\cos 2x \cos x - \sin 2x \sin x = 0$ (a, b, a, b)

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

$\cos 3x = 0$

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

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

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

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

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

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

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

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

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

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

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

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

$2\cos x = 0$, $\cos^2 x = \frac{1}{2}$

$\cos x = 0$ $\cos x = \pm \frac{1}{\sqrt{2}}$

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

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

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

Homework:

6.6 Handout #71-83 odd;

Examples #3,4,7,8 from solving equaons handout