New Directions: Find ALL the solutions (not just in $[0,2\pi)$)

62. $\sec 3x - \frac{2\sqrt{3}}{3} = 0$

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

$\sec \boxed{3x} = \frac{2}{\sqrt{3}}$

$3x = \frac{\pi}{6} + 2\pi k$ & $3x = \frac{11\pi}{6} + 2\pi k$, $k \in \mathbb{Z}$

$\boxed{x = \frac{\pi}{18} + \frac{2\pi k}{3}}$ & $\boxed{x = \frac{11\pi}{18} + \frac{2\pi k}{3}}$

68. $\cos \boxed{\left(2x - \frac{\pi}{4}\right)} = -\frac{\sqrt{2}}{2}$

$\cos\theta = -\frac{1}{\sqrt{2}}$

$2x - \frac{\pi}{4} = \frac{3\pi}{4} + 2\pi k$ & $2x - \frac{\pi}{4} = \frac{5\pi}{4} + 2\pi k$

$2x = \pi + 2\pi k$

$\boxed{x = \frac{\pi}{2} + \pi k}$

$2x = \frac{3\pi}{2} + 2\pi k$

$\boxed{x = \frac{3\pi}{4} + \pi k}$

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

$\sin x - \cos x = 1$

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

* raising both sides of an equation to an even power may introduce extraneous solutions, so make sure you check your answers!

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

$\underbrace{\sin^2 x + \cos^2 x} - 2\sin x\cos x = 1$

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

$\frac{-2\sin x\cos x}{-2} = \frac{0}{-2}$

$\sin x\cos x = 0$

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

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

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

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

$\sin\pi/2 - \cos\pi/2 = 1 - 0 = 1$

$\sin 3\pi/2 - \cos 3\pi/2 = -1 - 0 = -1$

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

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

$0 \le x < 2\pi$

$0 \le 4x < 8\pi$

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

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

$\tan(5x) = 0$

$0 \le x < 2\pi$

$0 \le 5x < 10\pi$

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

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

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

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

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

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

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

$2\cos x = 0$, $\cos x - 1 = 0$

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

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

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

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

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

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

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

$\cos 2x = 0$

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

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

$2\sin 2x - 1 = 0$

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

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

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

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

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

$\cos 3x = 0$

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

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

Homework for Test #3:

Homework #6 (submitted Wed. 09/17)
- 6.2 #1-41 odd sum, difference, and cofunction identities

Homework #7 (due Friday 09/26)
- 6.1 #1-69 odd proofs
- 6.3 #1-24 all double- and half-angle identities (application & proof)
  #30-36 all
  #49-93 odd
- 6.5 #1-24 all inverse functions
  #25-55 odd inverse functions

Homework #8 (due Friday 10/03?)
- 6.6 #1-21 odd finding solutions between 0 and 2pi
- 6.6 #61-69 odd finding all possible solutions (+2pi*k)
- 6.6 #71-83 odd;
- Examples #3,4,7,8 from solving equations handout
- Test 3 Practice Problems handout

Quiz #5 - Thursday 09/25
Test #3 - Friday 10/3?