Precalc BC **Trigonometry Equations** **Name** Key

Solve equations for all values between 0 and 2π.

1. $\sin 2x + \cos x = 0$

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

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

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

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

2. $3\sin\theta = 1 + \cos 2\theta$

$3\sin\theta = 1 + \cos^2\theta - \sin^2\theta$

$3\sin\theta = 2 - 2\sin^2\theta$

$2\sin^2\theta + 3\sin\theta - 2 = 0$

$(2\sin\theta - 1)(\sin\theta + 2) = 0$

$\sin\theta = \frac{1}{2}$ or ~~-2~~

$\theta = \frac{\pi}{6}, \frac{5\pi}{6}$

3. $\cos 2x = \cos x$

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

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

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

$\cos x = -\frac{1}{2}$ or 1

$\frac{2\pi}{3}, \frac{4\pi}{3}, 0$

4. $4\sin x\cos x = \sqrt{3}$

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

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

$2x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{7\pi}{3}, \frac{8\pi}{3}$

$x = \frac{\pi}{6}, \frac{\pi}{3}, \frac{7\pi}{6}, \frac{4\pi}{3}$

5. $\sin x \cdot \cos 2x + \cos x \cdot \sin 2x = \frac{1}{2}$

~~$\cos^2 x \cdot \sin 2x - \sin^3 x \cdot 2\sin x + 2\cos^2 x \sin x = \frac{1}{2}$~~

~~$2\sin x\cos x \cdot 2$~~

$\sin 3x = \frac{1}{2}$

$3x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{13\pi}{6}, \frac{17\pi}{6}, \frac{25\pi}{6}, \frac{29\pi}{6}$

$x = \frac{\pi}{18}, \frac{5\pi}{18}, \frac{13\pi}{18}, \frac{17\pi}{18}, \frac{25\pi}{18}, \frac{29\pi}{18}$

6. $\tan^2 x = 3\tan\frac{5\pi}{4}$

$\tan^2 x = 3$

$\tan x = \pm\sqrt{3}$

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

7. $4\sin x\cos x = \sin^2 x + \cos^2 x$

$2[2\sin x\cos x] = 1$

$2\sin 2x = 1$

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

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

8. $\sec^2\theta + 2 = 3\sec\theta$

$\sec^2\theta - 3\sec\theta + 2 = 0$

$(\sec\theta - 2)(\sec\theta - 1) = 0$

$\sec\theta = 2$ or 1

$\theta = \frac{\pi}{3}, \frac{5\pi}{3}, 0$