14 Problems: Solving Trigonometric Equations

Solve each of the following equations for x in $[0, 2\pi]$.

1. $\sqrt{3}\sec x = 2$
2. $4\sin x - 2\csc x = 0$
3. $\sin 2x = \cos x$
4. $\cos 2x - 3\sin x - 2 = 0$
5. $\tan x - 2\cos x \tan x = 0$
6. $3\cot^2 x = 1$
7. $2\cos^2 x + \sin x - 1 = 0$
8. $2\cos x - 1 = 0$
9. $2\cos x - 1 = \sec x$
10. $\sqrt{2}\sin x + \sin 2x = 0$
11. $\cos 2x - \cos x = 0$
12. $4\cos x - 2\sec x = 0$
13. $\sin x = \tan x$
14. $2 + \cos 2x = 3\cos x$

Reminder: You'll be given the following identities on your exam.

$$1 + \tan^2 x = \sec^2 x$$
$$1 + \cot^2 x = \csc^2 x$$
$$\sin(x \pm y) = \sin x \cos y \pm \cos x \sin y$$
$$\cos(x \pm y) = \cos x \cos y \mp \sin x \sin y$$

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

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