

Name _____

Date _____

Practice 8.3: Solving Trig Equations

Which of the values is a solution to the equation?

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

a. 30°

b. 60°

2. $\csc x - 2 = 0$

a. $\frac{5\pi}{6}$

b. $\frac{7\pi}{6}$

3. $3\tan^2 2x - 1 = 0$

a. $\frac{\pi}{8}$

b. $\frac{5\pi}{12}$

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

a. 45°

b. 135°

5. Find the solution(s) of the trig equations in the interval $[0, 2\pi)$.

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

b. $\tan x + 1 = 0$

c. $4\sin^2 x = 3$

$\sqrt{\sin^2 x} = \sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{2}$
 $\sin x = \pm \frac{\sqrt{3}}{2}$
 60°, 120°, 240°, 300°

d. $\sin^2 x = 3\cos^2 x$

$\sin^2 x - 3\cos^2 x = 0$
 $1 - \cos^2 x - 3\cos^2 x = 0$
 $1 - 4\cos^2 x = 0$
 $\sqrt{\cos^2 x} = \sqrt{\frac{1}{4}}$
 $\cos x = \pm \frac{1}{2}$
 $-4\cos^2 x = -1$

e. $\cos x(2\cos x + 1) = 0$

$\cos x = 0$ $2\cos x + 1 = 0$
 30°, 150°, 210°, 330°

f. $(3\tan^2 x - 1)(\tan^2 x - 3) = 0$

$3\tan^2 x - 1 = 0$ $\tan^2 x - 3 = 0$
 $\sqrt{\tan^2 x} = \sqrt{\frac{1}{3}}$ $\sqrt{\tan^2 x} = \sqrt{3}$
 $\tan x = \pm \frac{\sqrt{3}}{3}$ $\tan x = \pm \sqrt{3}$
 60°, 120°, 240°, 300°

g. $\sec x \csc x - 2\csc x = 0$

$\csc x (\sec x - 2) = 0$
 $\csc x = 0$ $\sec x - 2 = 0$
 $\sec x = 2$

h. $\sec^2 x - \sec x - 2 = 0$

$(\sec x - 2)(\sec x + 1) = 0$ like $x^2 - x - 2 = 0$
 $(x - 2)(x + 1) = 0$
 $\sec x - 2 = 0$ $\sec x + 1 = 0$
 $\sec x = 2$ $\sec x = -1$
 $\frac{1}{\cos} = \frac{1}{2}$ $\frac{1}{\cos} = -1$
 $\cos = \frac{1}{2}$ $\cos = -1$
 60°, 300° 180°

6. Solve the algebraic and trig eqs. Restrict the trig solutions to the interval $[0, 2\pi)$.

a. $x^2 + x - 20 = 0$
 $(x-4)(x+5) = 0$

$$\sin^2 x + \sin x - 20 = 0$$

b. $2x^2 + 7x - 15 = 0$
 $(2x - 3)(x + 5) = 0$

$$2\tan^2 x + 7\tan x - 15 = 0$$

7. Find all the solutions of the equations.

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



b. $\sqrt{3} \csc x - 2 = 0$

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

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

$60^\circ + n360^\circ$
 $120^\circ + n360^\circ$ *n is an integer*

c. $\tan^2 x = 3$

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

e. $2\sin^2 x + 3\sin x + 1 = 0$

f. $3\tan^3 x - \tan x = 0$

g. $2\sec^2 x + \tan^2 x - 3 = 0$

h. $2\sin^2 x = 2 + \cos x$