

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.  $30^\circ$

b.  $60^\circ$

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.  $45^\circ$

b.  $135^\circ$

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

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



b.  $\tan x + 1 = 0$

$\tan x = -1$

$x = 135^\circ, 315^\circ$

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

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

Handwritten work for d:  
 $\sin^2 x - 3\cos^2 x = 0$   
 $1 - \cos^2 x - 3\cos^2 x = 0$   
 $1 - 4\cos^2 x = 0$   
 $4\cos^2 x = 1$   
 $\cos^2 x = \frac{1}{4}$   
 $\cos x = \pm \frac{1}{2}$

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

Handwritten work for e:  
 $\cos x = 0 \Rightarrow x = 90^\circ, 270^\circ$   
 $2\cos x + 1 = 0 \Rightarrow 2\cos x = -1 \Rightarrow \cos x = -\frac{1}{2} \Rightarrow x = 120^\circ, 240^\circ$

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

$60^\circ, 120^\circ, 240^\circ, 300^\circ$

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

Handwritten work for g:  
 $\csc x (\sec x - 2) = 0$   
 $\csc x = 0$   
 $\sec x - 2 = 0 \Rightarrow \sec x = 2$

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

Handwritten work for h:  
 like  $x^2 - x - 2 = 0$   
 $(x-2)(x+1) = 0$

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

a.  $x^2 + x - 20 = 0$

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

b.  $2x^2 + 7x - 15 = 0$

$$(2x - 3)(x + 5) = 0$$

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

$$(2\tan x - 3)(\tan x + 5) = 0$$

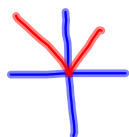
$$\tan x = \frac{3}{2} \quad \tan x = -5$$

$$\tan^{-1}\left(\frac{3}{2}\right) = x \quad \tan^{-1}(-5) = x$$

7. Find all the solutions of the equations.

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

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



$$60^\circ + n360^\circ$$

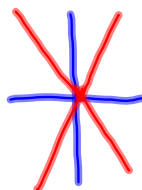
$$120^\circ + n360^\circ \quad n \text{ is any integer}$$

c.  $\tan^2 x = 3$

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

$$60^\circ + n180^\circ$$

$$120^\circ + n180^\circ$$



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