lgebra

Name: KEY

Solving Trig Equations Using Identities Day 2

Date: ______ Period: ______

Solve the following equations over the interval $[0°, 360°)$.

1.) $2\sin^2 x = -3\cos x + 3$

$2(1-\cos^2 x) = -3\cos x + 3$

$2 - 2\cos^2 x = -3\cos x + 3$

$0 = 2\cos^2 x - 3\cos x + 1$

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

$\cos x = 1/2 \quad \cos x = 1$

Solution(s): 60°, 300°, 0°

2.) $\cos^2 x - \sin^2 x = 0$

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

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

$\sqrt{\sin^2 x} = \sqrt{1/2}$

$\sin x = \pm \sqrt{2}/2$

Solution(s): 45°, 135°, 225°, 315°

3.) $\sec^2 x - 2\tan x = 4$

$1 + \tan^2 x - 2\tan x - 4 = 0$

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

$(\tan x + 1)(\tan x - 3) = 0$

$\tan x = -1 \quad \tan x = 3$

$x' = 71.57°$

Solution(s): 135°, 315°, 71.57°

251.57°

4.) $2\sin x - \tan x = 0$

$2\sin x = \tan x$

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

$2\sin x\cos x = \sin x$

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

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

$\sin x = 0 \quad \cos x = 1/2$

Solution(s): 0°, 180°, 60°, 300°

Solve the following equations over the interval $[0, 2\pi)$.

5.) $2\sin^2 x - \cos x - 1 = 0$

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

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

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

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

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

$\cos x = 1/2 \quad \cos x = -1$

Solution(s): $\pi/3,\ 5\pi/3,\ \pi$

6.) $\tan^2 x + 3 = -3\sec x$

$\sec^2 x - 1 + 3\sec x + 3 = 0$

$\sec^2 x + 3\sec x + 2 = 0$

$(\sec x + 1)(\sec x + 2) = 0$

$\sec x = -1 \quad \sec x = -2$

$\cos x = -1 \quad \cos x = -1/2$

Solution(s): $\pi,\ 2\pi/3,\ 4\pi/3$

7.) $\sec^2 x + \tan x = 1$

$1 + \tan^2 x + \tan x = 1$

$\tan^2 x + \tan x = 0$

$\tan x(\tan x + 1) = 0$

$\tan x = 0 \quad \tan x = -1$

Solution(s): $0,\ \pi,\ 3\pi/4,\ 7\pi/4$

8.) $\sin^2 x - \cos^2 x - \cos x - 1 = 0$

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

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

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

$\cos x = 0 \quad \cos x = -1/2$

Solution(s): $\pi/2,\ 3\pi/2,\ 2\pi/3,\ 4\pi/3$