SM 3H

Date: **Section:**

Objective:

Example: Find **all real numbers** that satisfy the equation $\cos\alpha = \frac{1}{2}$ from $[0, 2\pi)$. This means find all the angles where the adjacent side is positive $\frac{1}{2}$ in the unit circle.

Basic steps for finding ALL solutions to $\cos x = a$:

1.

*****One of these solutions will be $s = \cos^{-1} a$ and the other will be $2\pi - s = 2\pi - \cos^{-1} a$.

2.

Basic steps for finding ALL solutions to $\sin x = a$:

1.

*****You can do this by looking at the unit circle (usually this is less confusing) or by working algebraically. If $s = \sin^{-1} a > 0$, one of these solutions will be $s = \sin^{-1} a$ and the other will be $\pi - s = \pi - \sin^{-1} a$. If $s = \sin^{-1} a < 0$, the two solutions are $2\pi + s = 2\pi + \sin^{-1} a$ and $\pi - s = \pi - \sin^{-1} a$.

2.

Don't let the algebra freak you out! All you are doing is finding all the angles on the unit circle that satisfy the equation and adding $2k\pi$ to each one to form your solution set.

Basic steps for finding ALL solutions to $\tan x = a$:

1.

*****This will be either $s = \tan^{-1} a$ fi this value is positive, or $s + \pi = \tan^{-1} a + \pi$ if $= \tan^{-1} a$ is negative.

2.

(Remember that the tangent repeats every πinstead of every 2πlike sine and cosine.)

Examples: Find **all angles** in the interval **[0˚, 360˚)** that satisfy each equation. Round approximations to the nearest tenth of a degree. Work is to draw triangles.

a) $\cos \alpha = -\frac{1}{2}$

b) $\tan x + \sqrt{3} = 0$

Examples: Find **all angles** in the interval **[0, 2π)** that satisfy each equation. Round to the nearest hundredth. Draw triangles.

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

b) $\tan \alpha = 1$

Examples: Find **all angles** in <u>degrees</u> that satisfy each equation. Draw triangles.

a) $\cos \alpha = \frac{\sqrt{3}}{2}$

b) $\tan x + \sqrt{3} = 0$

Examples: Find **all real numbers** in **terms of π** that satisfy each equation. Draw triangles.

a) $\sin\alpha = \frac{\sqrt{2}}{2}$

b) $-3\tan x + \sqrt{3} = 0$

c) $\sin x = 1$

d) $\cos x = 0$

Examples: Find **all angles** in the interval **[0°, 360°)** that satisfy each equation. Round approximations to the nearest tenth of a degree. Draw triangles because your calculator will only give you one of the answers.

a) $\sin x = -0.4375$

b) $\cos x = 0.8913$

Examples: Find **all angles** in the interval **[0, 2π)** that satisfy each equation. Round to the nearest hundredth. Draw triangles because your calculator will only give you one of the answers.

a) $\tan\alpha = -3.5$

b) $6\cos x + \sqrt{10} = 0$