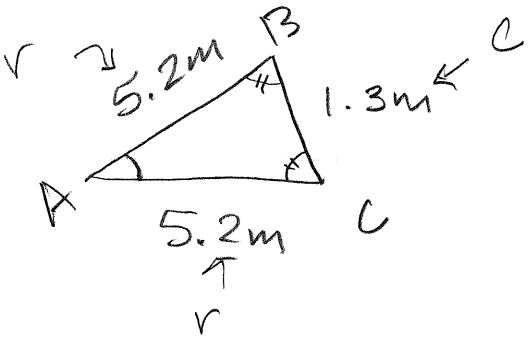
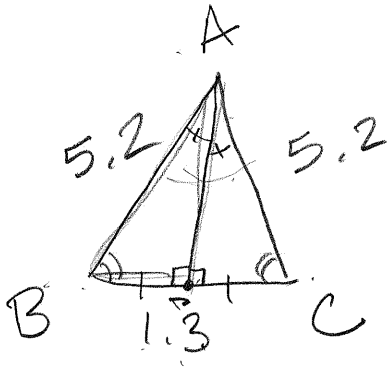
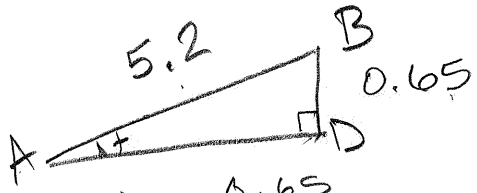
#110 10/27/2012 - Sec 4.2 Math 1060




$\sin A = \frac{0.65}{5.2}$

$\sin A =$

$A = \sin^{-1}\left(\frac{0.65}{5.2}\right)$

$A = 7.18°$

full Angle $= 2A$

$= \boxed{14.36°}$

or follow the instructions

$\theta = \cos^{-1}\left(1 - \frac{c^2}{2r^2}\right)$

# Sec 4.2 Solving Sine, Cosine, Tangent Equations

**Remember:** Identity is true for every $x$

Conditional Eq is true for only some values of $x$

## The Basic Cosine Equation

$\cos x = a$, to have a solution $-1 \le a \le 1$

$\cos x = \frac{\sqrt{2}}{2}$

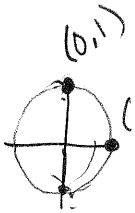
$x = \frac{\pi}{4}$ ← Quad I , $x = \frac{7\pi}{4}$ ← Quad IV

$$\left\{ x \mid x = \frac{\pi}{4} + 2k\pi \text{ or } x = \frac{7\pi}{4} + 2k\pi \right\}$$

Remember $k$ is any integer

$\cos x = 5$

No solution or $\varnothing$




$\cos x = 1$

$x = 0 + 2k\pi$

$\{x \mid x = 2k\pi\}$

$\cos x = 0$

$x = \frac{\pi}{2} + 2k\pi$

$x = \frac{3\pi}{2} + 2k\pi$

$\Downarrow$

$\{x \mid x = \frac{\pi}{2} + k\pi\}$

$\cos X = .7$

cosine + : I, IV

$X = \cos^{-1}(.7) = .7954$ $\quad \cos^{-1}(x) \Rightarrow$ I, IV

$\{X \mid X = \cos^{-1}(.7) + 2K\pi \text{ or } X = -\cos^{-1}(.7) + 2K\pi\}$

$\frac{\pi}{4} \Rightarrow \frac{7\pi}{4}$


$\sqrt{x^2} = \sqrt{4}$

$x = \pm\sqrt{4}$

Given as $x^2 = 4$ I get 2 answers

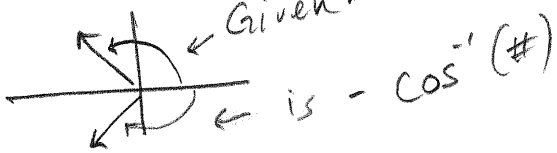
Given as $x = \sqrt{4}$ I get 1 answer

Given $\cos^{-1}(x)$ I get 1 answer

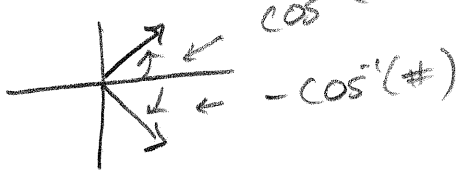
Given $\cos X = \#$, I get multiple answers

for cosine

− Ratio

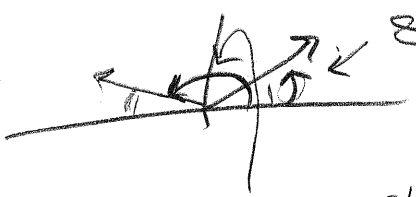



+ Ratio



# What about Sine?

+Ratio



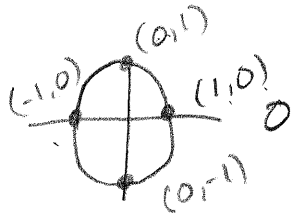

$\frac{5\pi}{6} = \pi - \frac{\pi}{6}$

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

$\left\{ x \mid x = \frac{\pi}{6} + 2k\pi \text{ or } x = \frac{5\pi}{6} + 2\pi k \right\}$

(Quad I: $\frac{\pi}{6}$; Quad II: $\frac{5\pi}{6}$)

$\sin x = 0$




$x = 0$ $\quad$ $x = \pi$

$x = 0 + k\pi$

$x = k\pi$

$k=-1 \quad k=0 \quad k=1$

$-1\pi, \quad 0\cdot\pi, \quad 1\cdot\pi$

$-\pi, \quad 0, \quad \pi$

区

$\pi + k\pi$

$(1+k)\pi$

$k=1$

$k=0$

$2\pi$

$1\pi$

$k=-2 \quad k=-1$

$(1+-2)\pi \quad (1+-1)\pi$

$-1\pi \quad 0\pi$

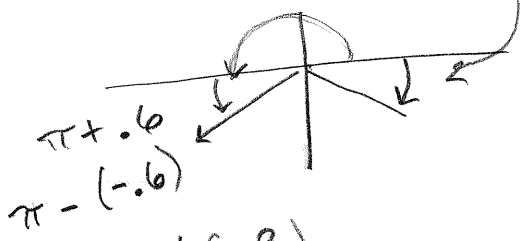
$-\pi \quad 0$

$\sin x = 2$ $\quad -1 \le \sin x \le 1$

No solution

$\sin x = -\frac{3}{5}$ Quad IV

$x = \sin^{-1}\left(\frac{-3}{5}\right) \approx -.6$




$x = \sin^{-1}\left(-\frac{3}{5}\right) + 2\pi k$

$x = \pi - \sin^{-1}\left(-\frac{3}{5}\right) + 2\pi k$

$x = \sin^{-1}\left(-\frac{3}{5}\right) + 2\pi k$ or $x = \pi - \sin^{-1}\left(-\frac{3}{5}\right) + 2\pi k$

**Side Note**

Pythagorean triple are # a, b, c that are integers that satisfy $a^2 + b^2 = c^2$

Ex: 3, 4, 5
5, 12, 13
7, 24, 25