Section 6.4 - Equations Involving Inverse Trig Functions

Definition: $\alpha = arcsin\beta \Leftrightarrow sin\alpha = \beta$

or

If $sinx = y$ **then** $sin^{-1}y = x$ **or** $arcsiny = x$

Example: rewrite $sin45° = \frac{\sqrt{2}}{2}$ as an INVERSE

Examples: Solve for x: (in terms of y)

1. $y = 3cos2x$

$\frac{y}{3} = \cos 2x$

$\cos^{-1}\left(\frac{y}{3}\right) = 2x$

$\frac{\cos^{-1}\left(\frac{y}{3}\right)}{2} = x$

2. $y = \arctan(2x - 1) + 5$

$y - 5 = \arctan(2x-1)$

$\tan(y-5) = 2x - 1$

$\frac{\tan(y-5)+1}{2} = x$

Examples: Solve for x: EXACT values

1. $2arcsinx = \pi$

$\sin^{-1}x = \frac{\pi}{2}$

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

$1 = x$

2. $arccosx = arcsin\frac{1}{5}$

$x = \cos\left(\arcsin\frac{1}{5}\right)$

$x = \cos\left(\frac{1}{5}, \frac{2\sqrt{6}}{1}\right)$

$x = \frac{2\sqrt{6}}{5}$

2. $sin^{-1}x + tan^{-1}\sqrt{3} = \frac{2\pi}{3}$

$\sin^{-1}x = \frac{2\pi}{3} - \tan^{-1}\sqrt{3}$

x

$\sin^{-1}x = \frac{2\pi}{3} - \frac{\pi}{3}$

$\sin^{-1}x = \frac{\pi}{3}$

$\pi/3$

$\sin = x$

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