

Sec 5.6 Inverse Trigonometric Functions + Differentiation

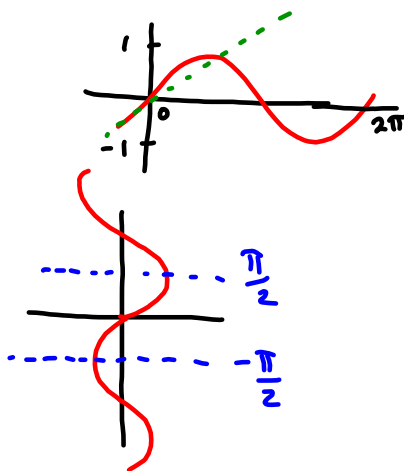
Find the inverse

$$f(x) = \sin x$$

$$\sin^{-1} x = \sin y$$

$$\sin^{-1} x = y$$

$$\arcsin x = y$$



Feb 29-7:34 AM

In textbook

iff if and only if

p.373

DEFINITIONS OF INVERSE TRIGONOMETRIC FUNCTIONS

Function	Domain	Range	
$y = \arcsin x$ iff $\sin y = x$	$-1 \leq x \leq 1$	$-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$	quad I and IV
$y = \arccos x$ iff $\cos y = x$	$-1 \leq x \leq 1$	$0 \leq y \leq \pi$	I & II
$y = \arctan x$ iff $\tan y = x$	$-\infty < x < \infty$	$-\frac{\pi}{2} < y < \frac{\pi}{2}$	I & IV
$y = \text{arccot } x$ iff $\cot y = x$	$-\infty < x < \infty$	$0 < y < \pi$	I & II
$y = \text{arcsec } x$ iff $\sec y = x$	$ x \geq 1$	$0 \leq y \leq \pi, y \neq \frac{\pi}{2}$	I & II
$y = \text{arccsc } x$ iff $\csc y = x$	$ x \geq 1$	$-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}, y \neq 0$	I & IV

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How to evaluate:

$$\text{arcsin}\left(-\frac{1}{2}\right) = y \xrightarrow{\sin}$$

$$-\frac{1}{2} = \sin y$$

where is $\sin, -\frac{1}{2}$?

$$y = \frac{11\pi}{6} \text{ or } -\frac{\pi}{6}$$

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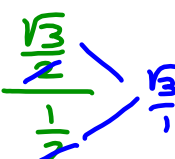
ex.

$$\arccos 0 = \frac{\pi}{2}$$

where is $\cos, 0$?

$$\arctan \sqrt{3} = \frac{\pi}{3}$$

where is $\tan \frac{\sqrt{3}}{1}$



$$\arcsin(0.3) = 0.305$$

$\sin^{-1}(0.3)$
calculator needs to be in radian mode

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Solve equations

$$\text{arctan}(2x - 3) = \frac{\pi}{4}$$

$$2x - 3 = \tan \frac{\pi}{4}$$

$$2x - 3 = 1$$

$$+3 \quad +3$$

$$2x = 4$$

$$x = 2$$

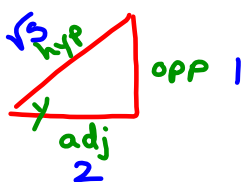
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ex. $y = \text{arcsec}\left(\frac{\sqrt{5}}{2}\right)$ Find $\tan y$

$$\sec y = \frac{\sqrt{5}}{2}$$

Use reference \triangle
 $\frac{\text{opp}}{\text{adj}}$

SOH-CAH-TOA



$$\tan y = \frac{1}{2}$$

p379
5-37 odd

$$c^2 = a^2 + b^2$$

$$\sqrt{5}^2 = 2^2 + b^2$$

$$5 = 4 + b^2$$

$$1 = b^2$$

$$1 = b$$

Feb 29-8:07 AM