4.7 Inverse Trig Functions

Graphs of inverse trig functions

Ranges of inverse trig functions

Evaluating

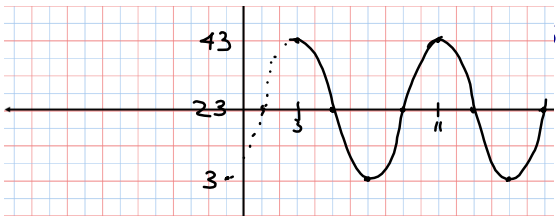
Compositions

Feb 13-9:27 AM

GO COUGARS!

Homework Questions

WS #2



1a.

b. 3 feet

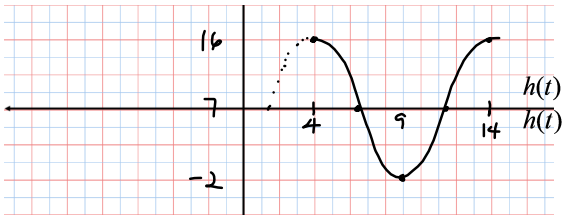
c. $h(t) = 20\sin(\frac{\pi}{4}(t-1))$

$h(t) = 20\cos(\frac{\pi}{4}(t-3))$

d. i. 8.86 ft, ii. 33 ft

iii. 23 ft, iv. 8.86 ft

e. 5.32 ft



2a.

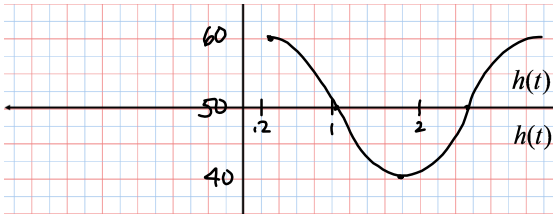
b.

$h(t) = 9\sin(\frac{\pi}{5}(t-1.5)) + 7$

$h(t) = 9\cos(\frac{\pi}{5}(t-4)) + 7$

c. i. 14.28 ft, ii. 4.22 ft

d. .082 sec out, 7.92 sec



3a.

b.

$h(t) = -10\sin(\frac{2\pi}{3}(t-1.05)) + 50$

$h(t) = 10\cos(\frac{2\pi}{3}(t-.3)) + 50$

c. 43.31 cm

d. 58.09 cm e. .52 sec

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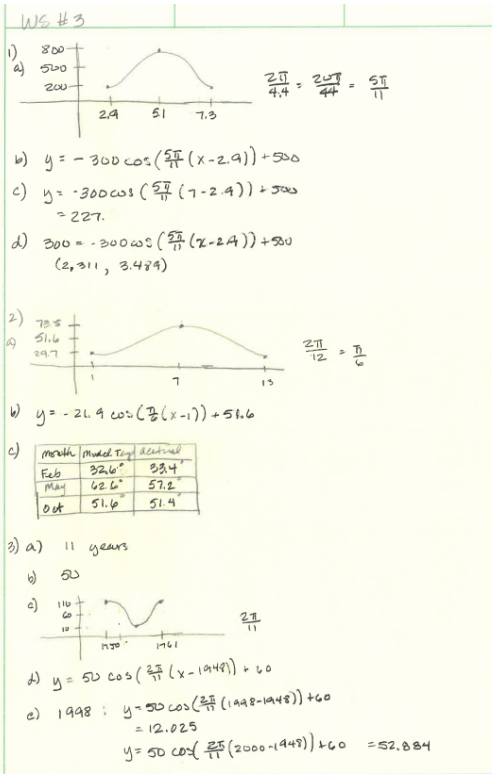
Homework Questions



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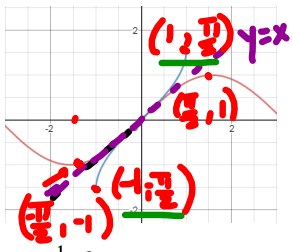
Let's review the domains and ranges of the six trig functions we are familiar with.

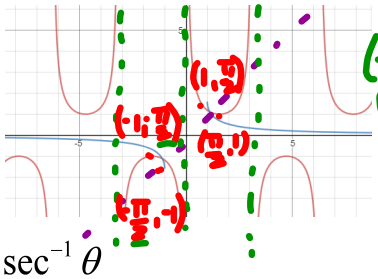
	domain	range
$\sin x$	$(-\infty,\infty)$	$[-1,1]$
$\cos x$	$(-\infty,\infty)$	$[-1,1]$
$\tan x$	$(-\infty,\infty)$ $x \neq \frac{k\pi}{2}$, k is odd integer	$(-\infty,\infty)$
$\csc x$	$(-\infty,\infty)$ $x \neq k\pi$ k is integer (or 0)	$[-\infty,-1][1,\infty)$
$\sec x$	$(-\infty,\infty)$ $x \neq \frac{k\pi}{2}$, k is odd integer	$(-\infty,-1][1,\infty)$
$\cot x$	$(-\infty,\infty)$ $x \neq k\pi$, k is an integer (or 0)	$(-\infty,\infty)$

Feb 21-7:02 AM

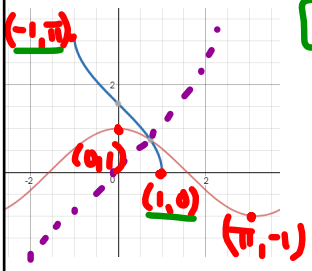
$\sin^{-1}\theta$ Domain Range $[-1,1]$ $[-\frac{\pi}{2},\frac{\pi}{2}]$



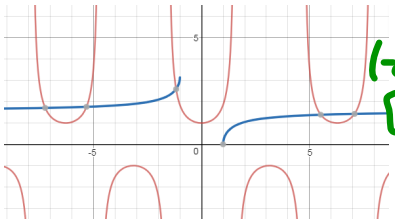
$\csc^{-1}\theta$ Domain Range $(-\infty,-1]\ [1,\infty)$ $[-\frac{\pi}{2},\frac{\pi}{2}]$ $\theta \neq 0$ or $[-\frac{\pi}{2},0)(0,\frac{\pi}{2}]$



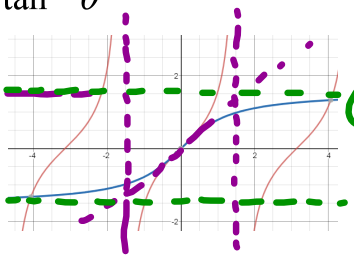
$\cos^{-1}\theta$ Domain Range $[-1,1]$ $[0,\pi]$



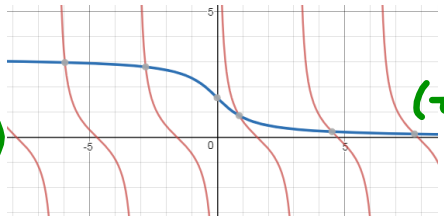
$\sec^{-1}\theta$ Domain Range $(-\infty,-1]\ [0,\pi]$ $[1,\infty)$ $\theta \neq \frac{\pi}{2}$ $[0,\frac{\pi}{2})(\frac{\pi}{2},\pi]$



$\tan^{-1}\theta$ Domain Range $(-\infty,\infty)$ $(-\frac{\pi}{2},\frac{\pi}{2})$



$\cot^{-1}\theta$ Domain Range $(-\infty,\infty)$ $(0,\pi)$



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Summary of Ranges of Trig Functions

cos $[0,\pi]$ sin $[-\frac{\pi}{2},\frac{\pi}{2}]$

cot $(0,\pi)$ tan $(-\frac{\pi}{2}\ \frac{\pi}{2})$

sec $[0,\pi]$ $\theta \neq \frac{\pi}{2}$ csc $[-\frac{\pi}{2},\frac{\pi}{2}]$ $\theta \neq \pi$

Feb 9-10:11 AM

$\sin^{-1}\theta$ *means the same as* $\arcsin\theta$

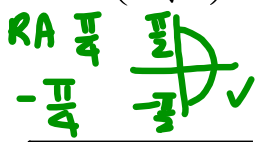
$\sin^{-1}\theta$ *and* $\arcsin\theta$ are kinda like $\sin\theta = x$

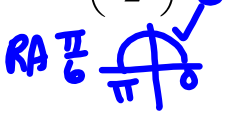
but with the restrictions imposed by the inverse function

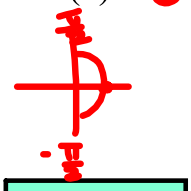
use radians

Evaluate the inverse function

$\arcsin\left(-\frac{1}{\sqrt{2}}\right) = -\frac{\pi}{4}$ $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right) = \frac{\pi}{6}$ $\tan^{-1}\left(-\sqrt{3}\right) = -\frac{\pi}{3}$ $\arctan(0) = 0$ $\arccos(3)$







not possible

D = [-1, 1]

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Compositions

$\tan\left(\arctan\left(\frac{1}{\sqrt{3}}\right)\right)$

RA π/6

$\tan\left(\frac{\pi}{6}\right)$

$\frac{1}{\sqrt{3}}$

$\arccos(\cos\pi)$

$\arccos(-1)$

π

Feb 13-9:35 AM

BUT....

$\arcsin\left(\sin\left(\frac{5\pi}{6}\right)\right)$ outside arcsin range

$\arcsin\left(\frac{1}{2}\right)$

RA $\frac{\pi}{6}$

$\frac{\pi}{6}$

$\cos\left(\arctan(-1)\right)$

RA $\frac{\pi}{4}$

$\cos\left(-\frac{\pi}{4}\right)$

$\frac{1}{\sqrt{2}}$

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If the value is not a common ratio:

draw a $\triangle$

$\tan\left(\arccos\left(\frac{1}{3}\right)\right)$

$\tan\left(\frac{3}{1}\ \frac{2\sqrt{2}}{}\right)$

$2\sqrt{2}$

$\cot(\arcsin(-2x))$

$\cot\left(\frac{1}{\sqrt{1-4x^2}}\ \frac{}{-2x}\right)$

$\frac{\sqrt{1-4x^2}}{-2x}$ $x \neq 0$

$[-\frac{1}{2}, 0)(0, \frac{1}{2}]$

$1-4x^2 \geq 0$

$(1-2x)(1+2x) \geq 0$

CN $x=\frac{1}{2}$ $x=-\frac{1}{2}$

$-\frac{1}{2}$ $\frac{1}{2}$

Feb 13-9:37 AM

HOMEWORK

p 349 1-15 odd, 29-39 odd, 47-67odd, 71

Feb 2-9:51 PM