A *Relation* is a correspondence between 2 sets. Each *x* in one set is assigned one or more *y*'s in another set.

Recall: Functions that are 1-to-1 have inverse relations that are functions.

$f(x) = x^2$ isn't 1-to-1

x	$f(x) = y$
-1	1
0	0
1	1
2	4

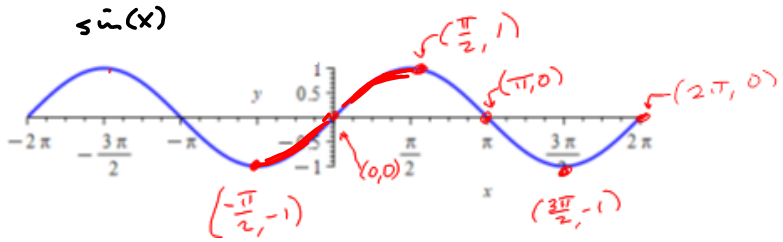
y	$f^{-1}(y) = x$
-1	∄
0	0
1	1, -1
4	2, -2

} more than one output for the inverse relation. Not a function.

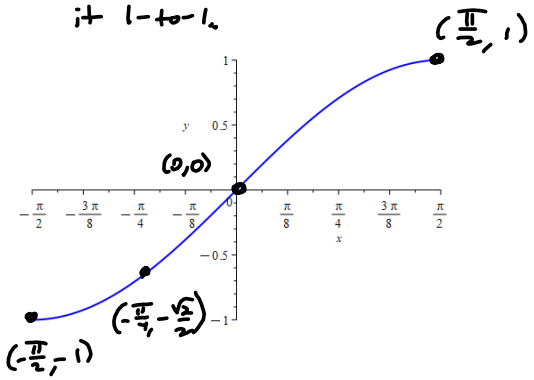
This happens whenever the graph looks like: ⌒ ⌣

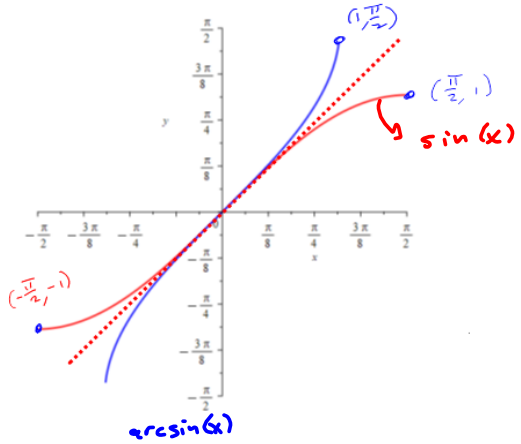
No local max's or local mins.

Chop off sine & cosine outside of longest interval on which they're increasing or decreasing.



Restricted Sine to make it 1-to-1.





Graph of f^{-1} is the reflection of the graph of $f(x)$ thru the line $y = x$.

How to keep the domains and ranges straight: Remember the restricted domain and the range of the original trig function.

Restrictions for inverses:

$\sin(x)$ $D(\sin(x)) = [-\frac{\pi}{2}, \frac{\pi}{2}]$, $R(\sin(x)) = [-1, 1]$

$\arcsin(x)$ $R(\arcsin(x)) = [-\frac{\pi}{2}, \frac{\pi}{2}]$, $D(\arcsin(x)) = [-1, 1]$

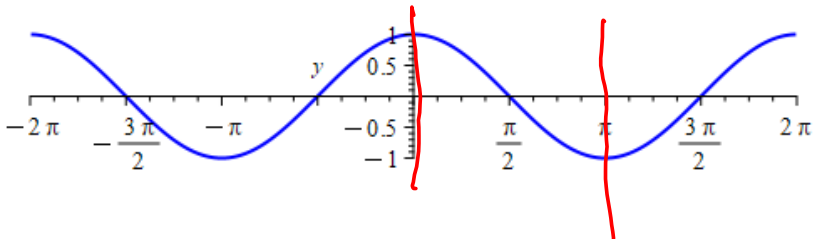
$\cos(x)$ $D(\cos(x)) = [0, \pi]$, $R(\cos(x)) = [-1, 1]$

$\arccos(x)$ $R(\arccos(x)) = [0, \pi]$ $D(\arccos(x)) = [-1, 1]$

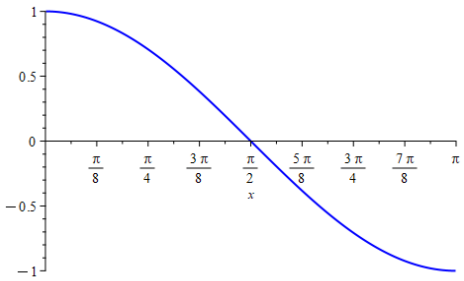
$\tan(x)$ $D(\tan(x)) = (-\frac{\pi}{2}, \frac{\pi}{2})$, $R(\tan(x)) = (-\infty, \infty)$

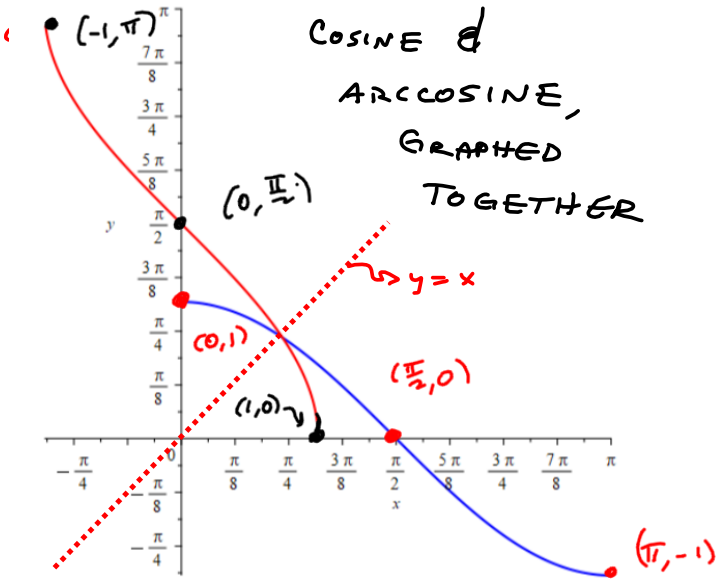
$\arctan(x)$ $R(\arctan(x)) = (-\frac{\pi}{2}, \frac{\pi}{2})$, $D(\arctan(x)) = (-\infty, \infty)$

Graph cosine and arccosine



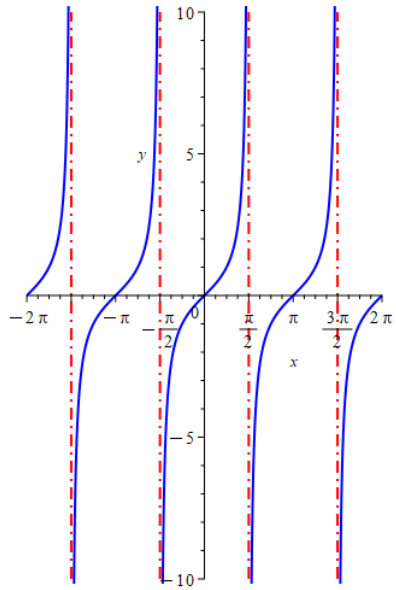
Restricted Cosine



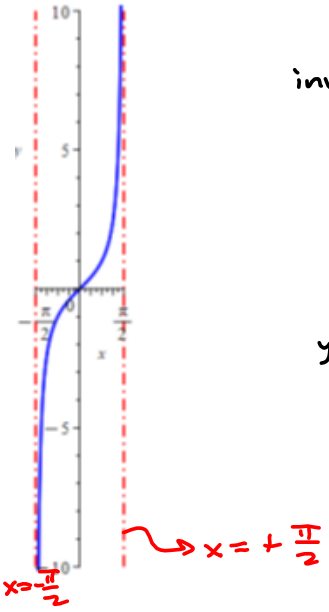


COSINE & ARCCOSINE, GRAPHED TOGETHER

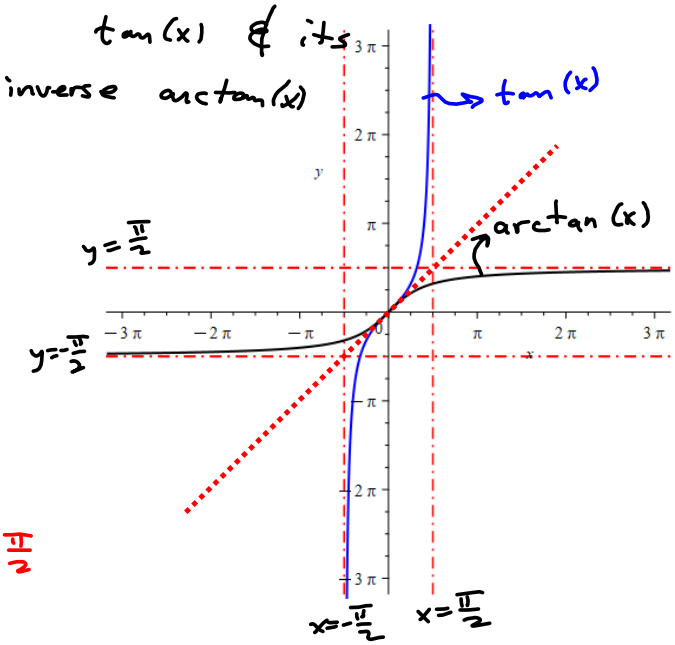
Graph of tangent and arctangent



Restricted Tangent



tan(x) & its inverse arctan(x)



Now to go to work with this stuff.

NOTE: Section 1.7 #12 is kind of messed up. I submitted an error report. Giant pain to do so.

"Your case number is 10948355." So we're working on that, and hopefully it will be resolved before you hit 1.7 #12 in the WebAssign Homework.

Today is a day for questions and for me to work exercises of note.

If you prefer to work on your own, that's OK. Just send me at least one chat, so I feel some connection. I'm a bit needy.

I need one chat from everybody.

Thanks, guys!

Prepping for WebAssign Test: After you're done with 1.8 homework, take Practice Test 1. It will require a lockdown browser.

https://harryzaims.com/public_html/121-online/videos/00-Orientation/Lockdown-Browser.mp4

Take it, record which questions caused you to struggle.

Go back to homework and "Practice Another Version"

One-page, one-sided cheat sheet is permitted. I've made a couple.

Section 1.7 #1

Function	Alternative Notation	Domain	Range
$y = \arcsin x$	$y = \sin^{-1}(x)$ ✔	$[-1,1]$ ✔	$-\frac{\pi}{2} \le y \le \frac{\pi}{2}$

A set

A condition placed on y.

$\{y \mid -\frac{\pi}{2} \le y \le \frac{\pi}{2}\}$ is the set. Another way to write it is as an interval: $[-\frac{\pi}{2}, \frac{\pi}{2}]$

Midterm will be on the day in the course schedule.

Go to Horizon Hall, Rm 103 to check in.

They'll be open from 7 am to 8 pm.

Checking my dates:

Our Day

MAT 1420 R11 - Wednesday, March 20th.

Set aside 2 hours!

MAT 2410 R11 - Tuesday, March 5th.

If you can't make either of those two dates, off you go to the Testing Center. Franz ramrods that outfit. Make an appointment with the Testing Center for your test.

WebAssign Tests are taken at home and you're on your honor to only use a 1-sided, 1-page cheat sheet.

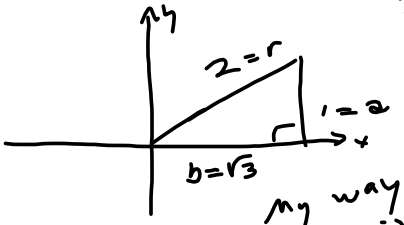
Find the exact value of the expression, if possible. (If not possible, enter IMPOSSIBLE.)

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

$r^2 - a^2 =$

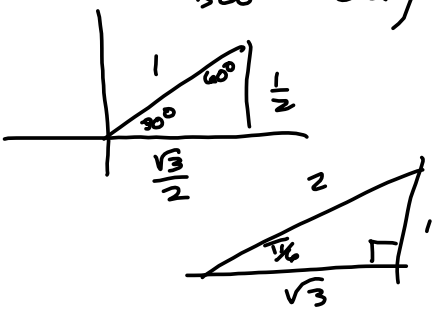
$2^2 - 1^2 = 4 - 1 = 3 = b^2 \rightarrow$

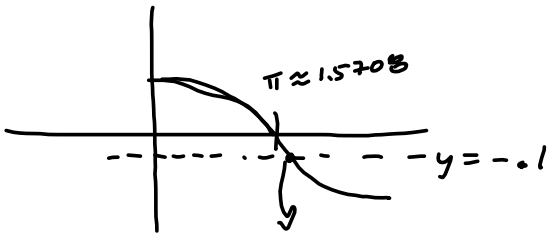
$b = \sqrt{3}$



my way
Recognize
"1-2-√3"
situation.

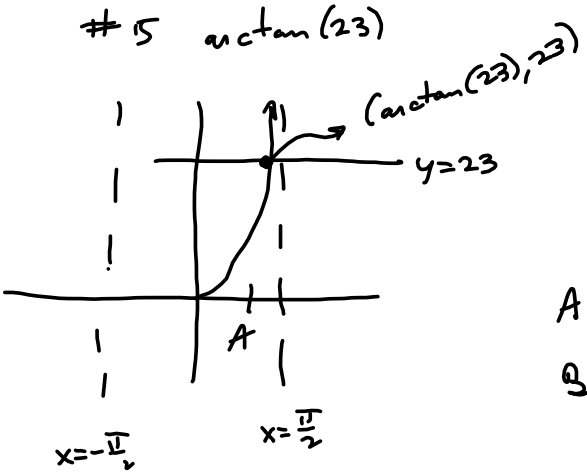
Book Way





1.6710

#5 $\arctan(23)$



$A = \arctan(23)$

Between 0 & $\frac{\pi}{2} \approx 1.5708$

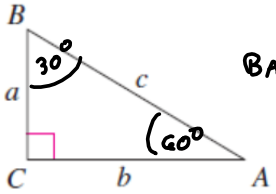
$\arctan(23) \approx$ 1.527345431403365777158147347513759880591100019705447789 49

Solve the right triangle shown in the figure for all unknown sides and angles. Round your answers to two decimal places.

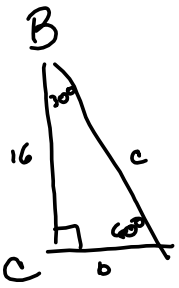
$A = 60°, \quad c = 16$

$B =$ 30 °
$C =$ 90 °
$a =$ 13.86
$b =$ 8.00

Wrong picture Label!



BAD Pic.



$\tan(B) = \tan(30°)$

$= \frac{b}{16}$

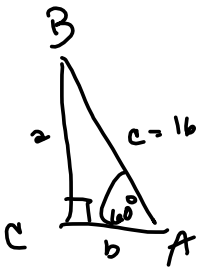
$\frac{b}{16} = \tan(30°)$

$b = 16\tan(30°)$

13.8564064605510

$\tan 60° = \frac{16}{b} \Rightarrow$

$b = \frac{16}{\tan(60°)}$



$\sin(A) = \sin(60°) = \frac{a}{c} = \frac{a}{16}$

$\Rightarrow a = 16\sin(60°) \approx 16\left(\frac{\sqrt{3}}{2}\right) \approx 13.86 \approx a$

$\cos(A) = \frac{b}{16} \Rightarrow$

$b = 16\cos(60°) \approx 16\left(\frac{1}{2}\right) = 8 = b$

1.8 #11

Solve the right triangle shown in the figure for all unknown sides and angles. Round your answers to two decimal places.

$B = 66° 18'$, $a = 154.5$

$60'$ per degree (Minutes)

$6''$ per minute (Seconds)

$B = 66° + \left(\frac{18}{60}\right)^{\circ} = 66.3^{\circ}$ → For calculator

$20' = \frac{1}{3}^{\circ} = .\overline{33}^{\circ}$

$\frac{18}{60} = \frac{9}{30} = \frac{3}{10} = .3$ $\frac{9}{30} = \frac{3}{10} = .3$

$\sin(60 + \frac{18}{60})$