L 34 - MA 110.

- REEF #1. Has 2 right answers.

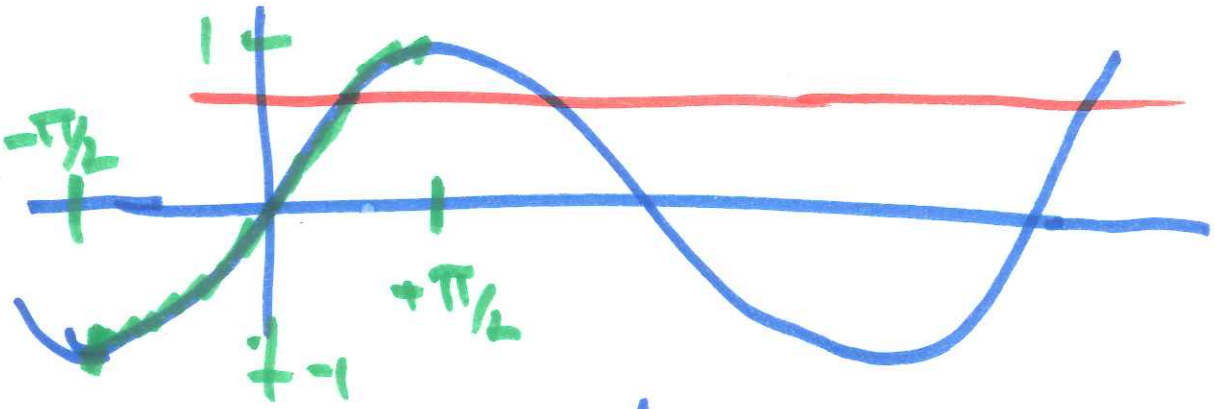
Exam 3. T. 11/15 @ 7:30 - 9:30 pm.

Memorize trig. id. on p. 505-06 of text book. Others will be given if needed.

Problems

Inverse trig functions.

$y = \sin(x)$



$\sin(x)$ is not one-one.

Restrict domain to give a new function which is one-one.

- Want new domain to be as large as possible

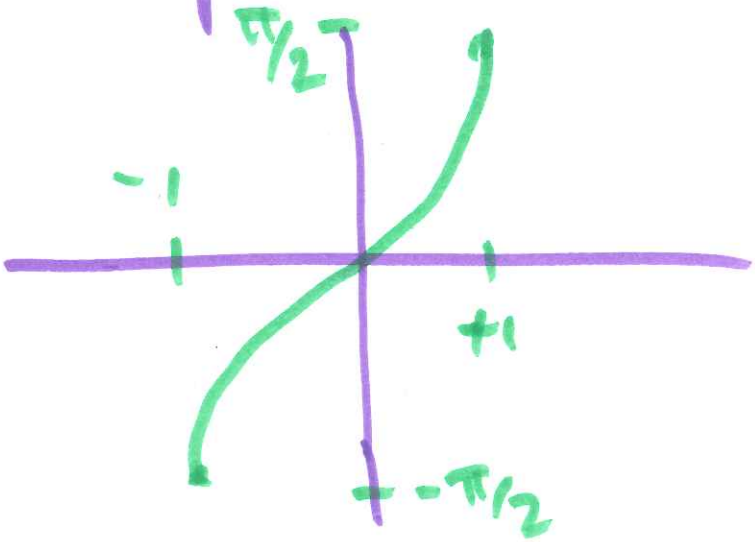
- Want $\sin(x)$ to be one-one on the new domain
- Want new domain to be an interval.

Define $\sin^{-1}$.

- Let $f:[-\frac{\pi}{2}, \frac{\pi}{2}] \to [-1, 1]$. $f(x) = \sin(x)$.

$\sin^{-1}$ is f^{-1}. Also denoted arcsin.

Graph arcsin.



Domain of arcsin is $[-1, 1]$

Range is $[-\frac{\pi}{2}, \frac{\pi}{2}]$.

Find $\sin^{-1}(1)$

$\sin^{-1}(-1/2)$.

If $x = \sin^{-1}(1)$ then

$1 = \sin(x)$.

Know $\sin(\frac{\pi}{2}) = 1$.

$\sin^{-1}(1) = \frac{\pi}{2}$.

$\sin^{-1}(-1/2) = t$ then

$\sin(t) = -1/2$. and

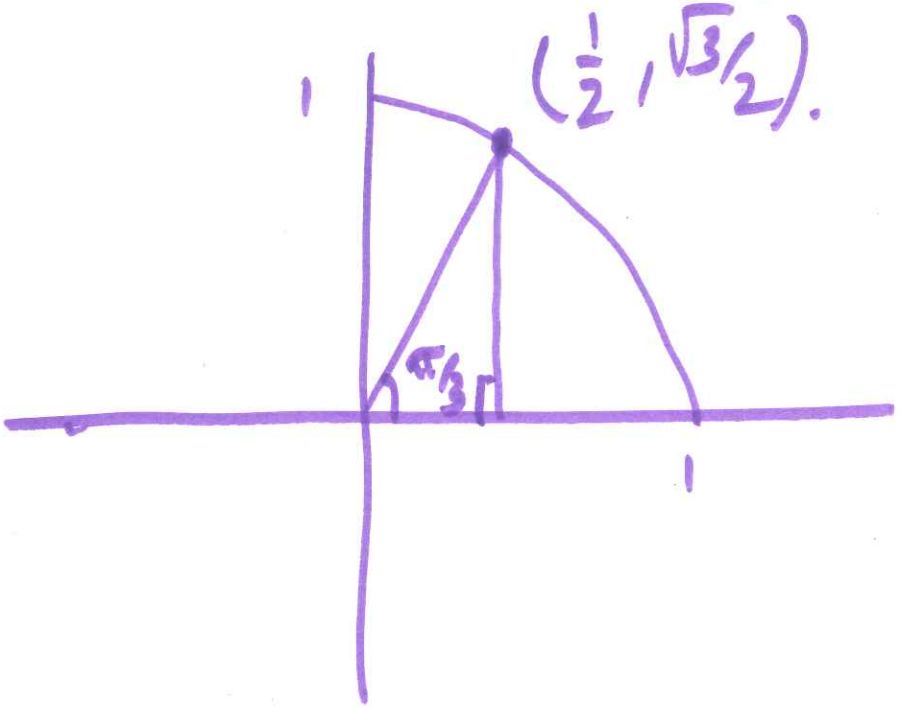
$t \in [-\frac{\pi}{2}, \frac{\pi}{2}]$

$t = -\pi/6$ has

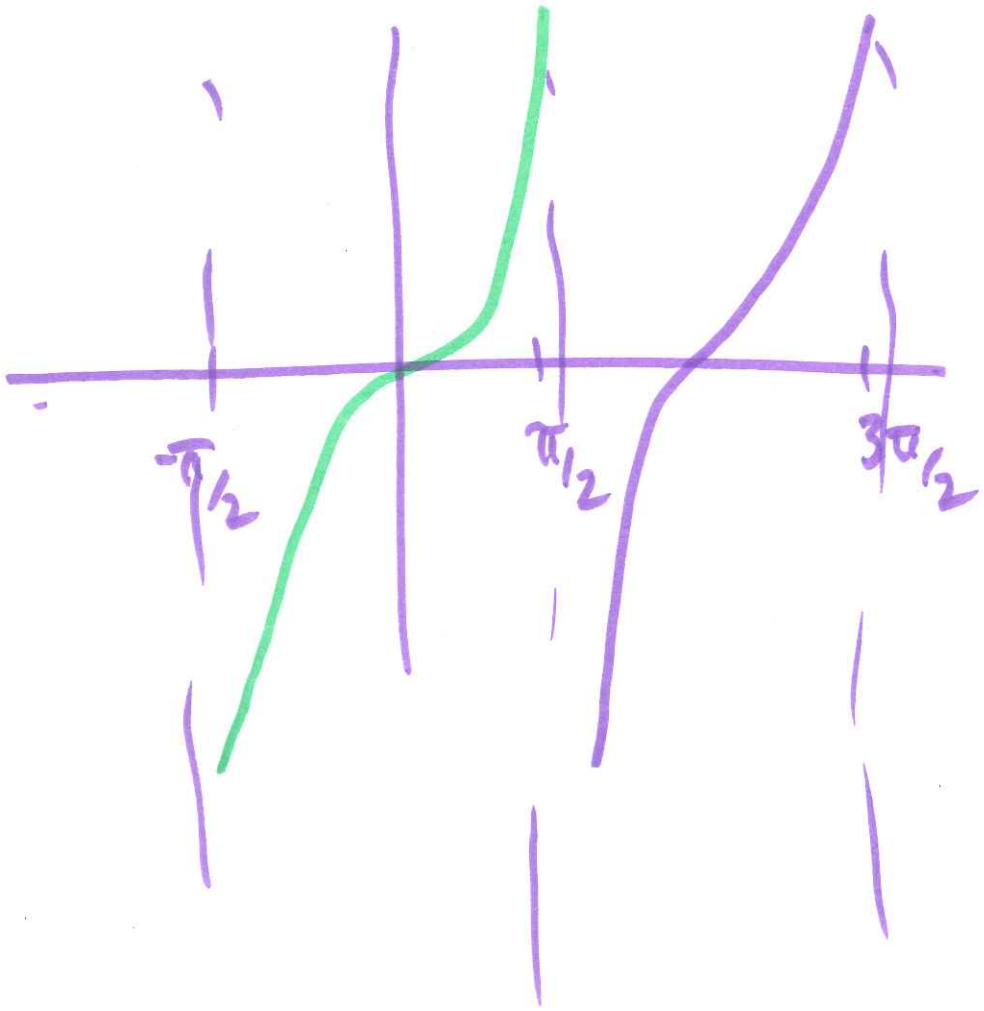
$\sin(-\frac{\pi}{6}) = -1/2$

REF #2.

Find $\sin^{-1}(\frac{\sqrt{3}}{2})$.

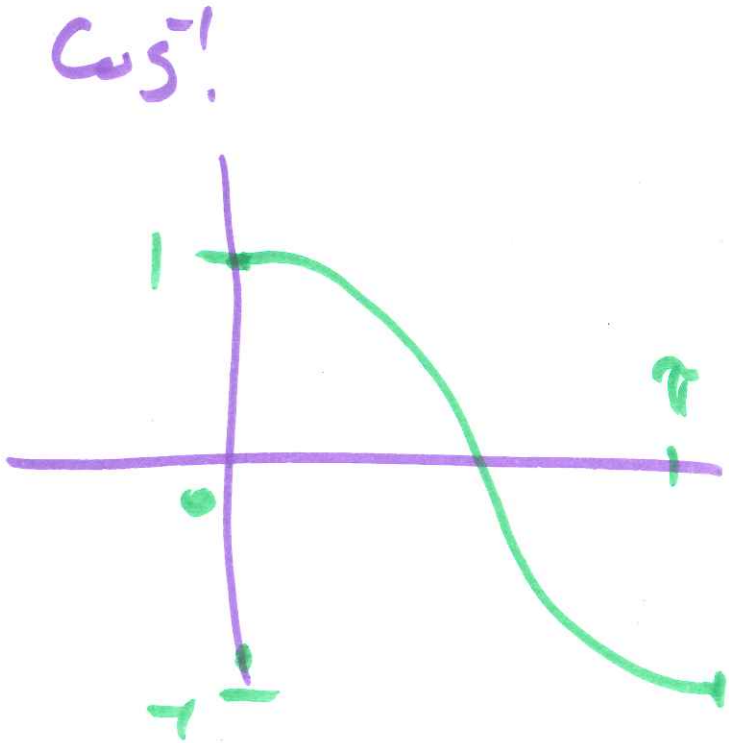


Define $\tan^{-1}$. use $\tan(x)$ on domain $(-\pi/2, \pi/2)$.



Domain of $\tan^{-1}$ is $(-\infty, \infty)$.

Range is $(-\frac{\pi}{2}, \pi/2)$



$\cos^{-1}$ is the inverse of cos on the domain $[0, \pi]$.

Domain of $\cos^{-1}$ is $[-1, 1]$

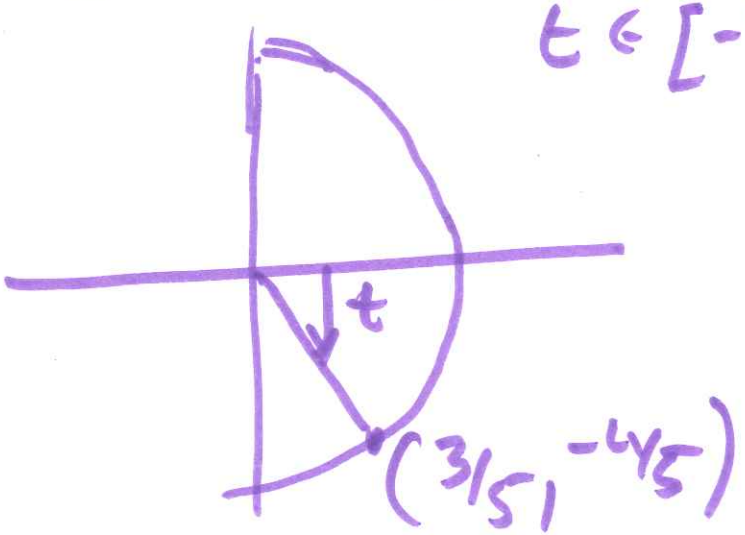
Range of $\cos^{-1}$ is $[0, \pi]$.

Find

$\cos(\sin^{-1}(-4/5))$.

$t = \sin^{-1}(-4/5)$.

$t \in [-\pi/2, \pi/2]$



$1 = \cos^2(t) + \sin^2(t)$.

$\cos^2(t) = 1 - \sin^2(t)$.

$\cos(t) = \pm\sqrt{1 - \sin^2(t)}$.

Choose + since

$\cos(t) > 0$ for t

in $[-\pi/2, \pi/2]$.

$\cos(t) = +\sqrt{1 - (-\frac{4}{5})^2}$

$= 3/5$

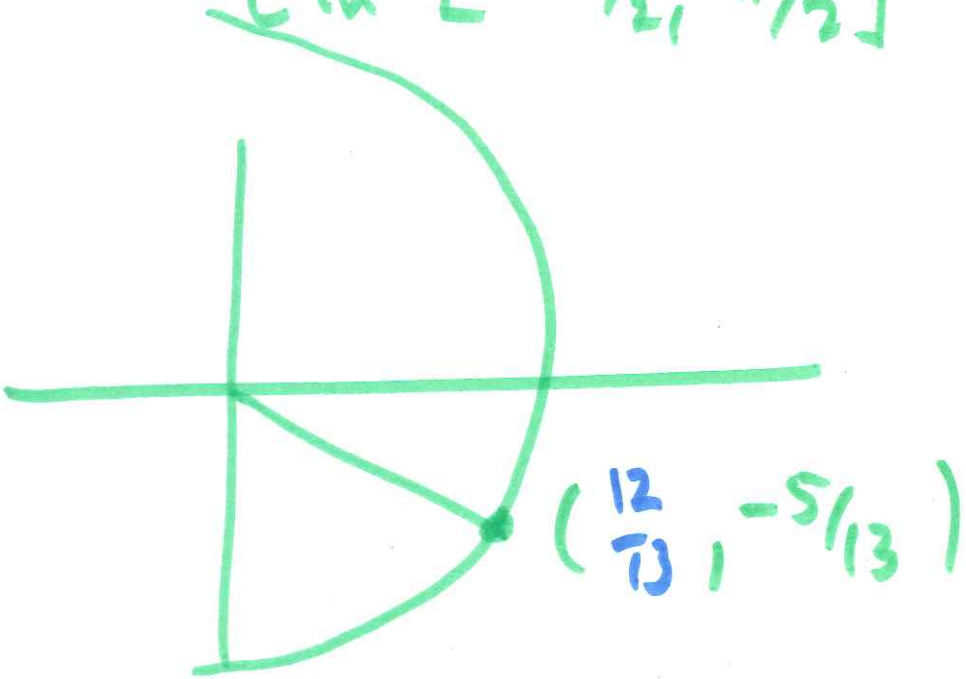
$\cos(\sin^{-1}(-4/5)) = 3/5$.

Find $\tan(\sin^{-1}(-5/13))$

Let $t = \sin^{-1}(-5/13)$.

$\sin(t) = -5/13$.

t in $[-\pi/2, \pi/2]$



$\cos(t) = +\sqrt{1-\sin^2(t)}$

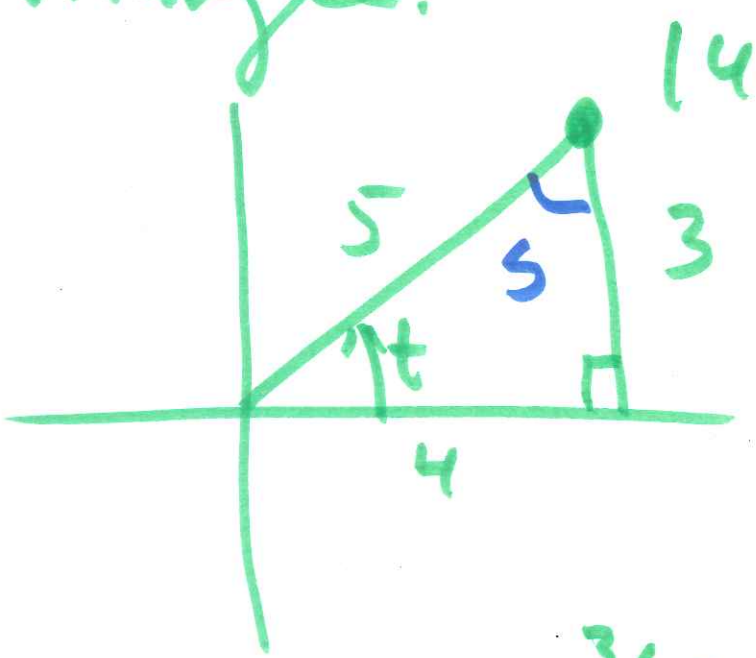
$= \sqrt{1-(-5/13)^2}$

$= 12/13$.

$\tan(t) = \dfrac{\sin(t)}{\cos(t)}$

$= -5/12$.

Find the angles in a 3-4-5 right triangle.



$\sin(t) = 3/5$

$t = \sin^{-1}(3/5)$.

≈ 0.6435

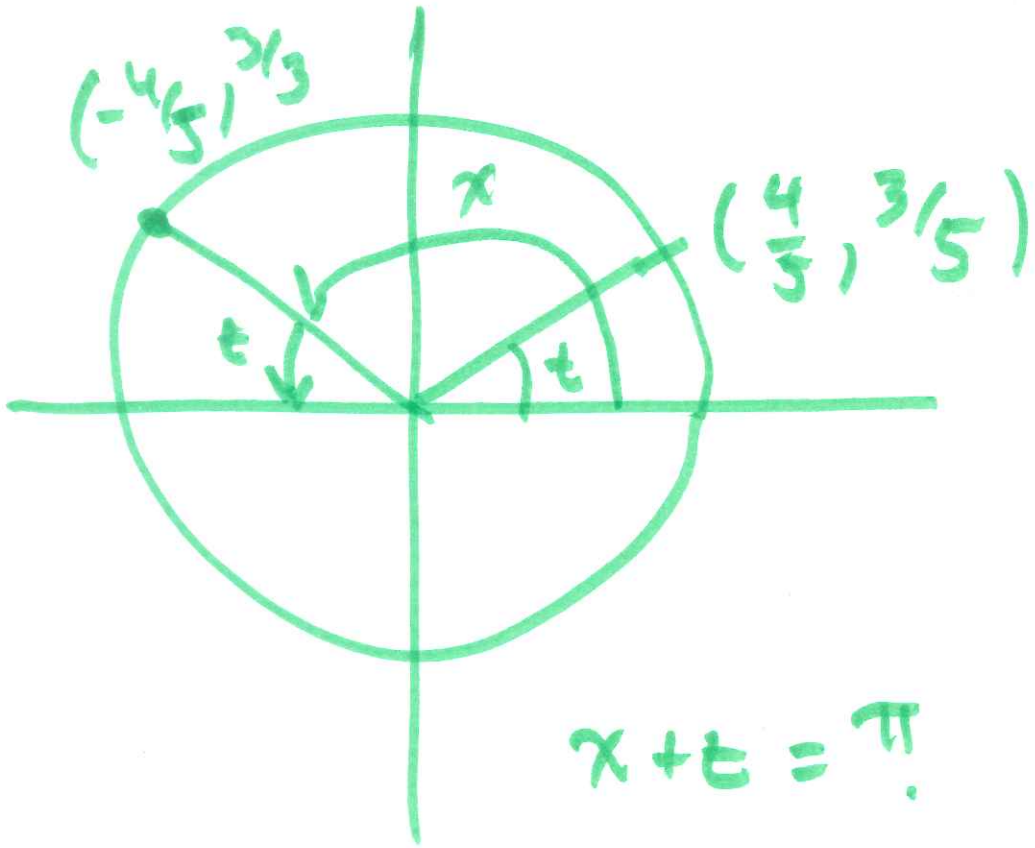
$s = \frac{\pi}{2} - \sin^{-1}(3/5)$

$= \frac{\pi}{2} - 0.6435$

≈ 0.9273

The 3rd angle is $\pi/2$.

Find an angle x so that x is in quadrant 2 and $\sin(x) = 3/5$



$$x + t = \pi$$

$$x = \pi - t$$

$$= \pi - \sin^{-1}(3/5)$$

$$\approx 2.4980\ldots$$

REF #4

$t = \sin^{-1}(\sin(5))$

$= 2\pi - 5 \neq 5.$

$(\cos(5), \sin(5))$

$t = 2\pi - 5.$

A is false.