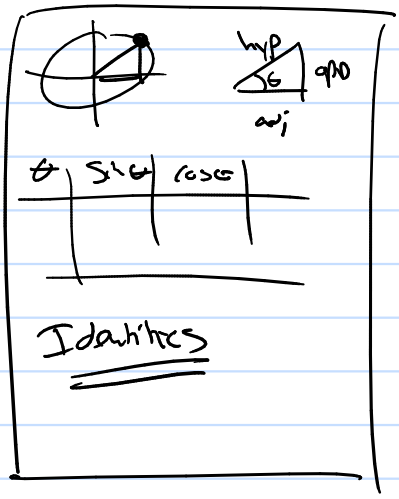
Math 112

Q's



3 Evaluate the following expressions. Your answer must be an angle in radians in the interval $[-\frac{\pi}{2}, \frac{\pi}{2}]$.

1. $\sin^{-1}(1)=$ $\pi/2$ or $90°$
2. $\sin^{-1}(\frac{\sqrt{2}}{2})=$ $\pi/4$ or $45°$
3. $\sin^{-1}(0)=$ 0 or $0°$

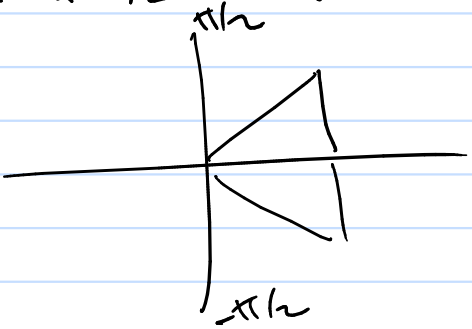
sin (angle) = ratio

$\sin^{-1}$ (ratio) = angle

restricted to the "window" of the inverse

angle	sin(θ)
$-90°$ or $-\pi/2$	-1
$-60°$ or $-\pi/3$	$-\sqrt{3}/2$
$-45°$ or $-\pi/4$	$-\sqrt{2}/2$
$-30°$ or $-\pi/6$	$-1/2$
$0°$ or 0	0
$30°$ or $\pi/6$	$1/2$
$45°$ or $\pi/4$	$\sqrt{2}/2$
$60°$ or $\pi/3$	$\sqrt{3}/2$
$90°$ or $\pi/2$	1

$\sin^{-1}(-\sqrt{3}/2) =$ $-60°$ or $-\pi/3$



what about $\sin^{-1}(\frac{1}{10})$

↑

not on table?

go ahead and stop $\sin^{-1}(\frac{1}{10})$

Now that we have --

1. Trig functions / Inverse Trig functions
2. Identities
3. Graphs

Equations? Inequalities?

Solve | expression = expression

to solve is to find all values that make the equality true.

ex | $\frac{3x-1}{} = \frac{2}{x+1} - 4$

ex $3x(x+5) = x^2 - x - 2$

ex | $\sqrt{x+1} = 2$

ex | $\log_3(2x-1) = 7$ → $2x-1 = 3^7$

ex | $\sin(3x+1) = \sqrt{2}/2$ | trigonometric equation ✱

Trig Equations:

① isolate the trig function

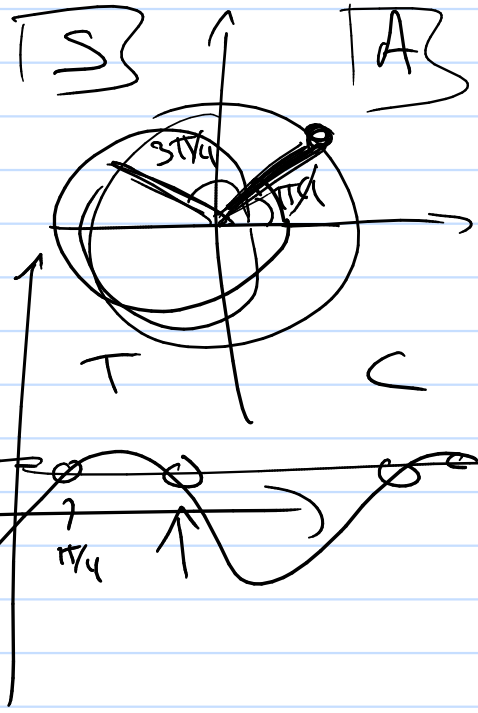
ex $2\sin(3x+1) - \sqrt{2} = 0$

$\sin(3x+1) = \sqrt{2}/2$

tech #1 is it in the table?

$\sin(3x+1) = \sqrt{2}/2$

so b/c $\sin(\pi/4) = \sqrt{2}/2$



gives $3x+1 = \pi/4$

① $3x+1 = \pi/4 + 2n\pi$ or

② $3x+1 = 3\pi/4 + 2n\pi$

① $3x+1 = \pi/4 + 2n\pi$

$3x = \pi/4 - 1 + 2n\pi$

$x = \pi/12 - 1/3 + \frac{2}{3}n\pi$

$(n = \ldots, -2, -1, 0, 1, 2, \ldots)$

② $3x+1 = 3\pi/4 + 2n\pi$

$3x = \frac{3\pi}{4} - 1 + 2n\pi$

$x = \frac{\pi}{4} - \frac{1}{3} + \frac{2}{3}n\pi$

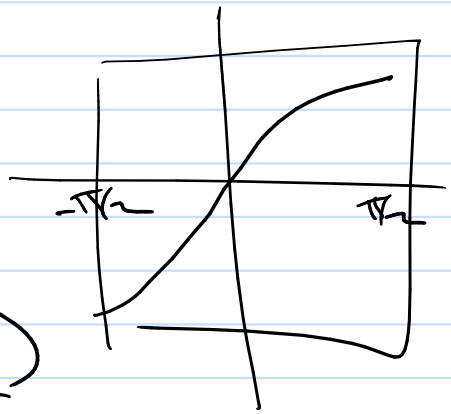
$(n = \ldots, -3, -1, 0, 1, 3, \ldots)$

tech #2

$$2\sin(3x+1) - \sqrt{2} = 0$$

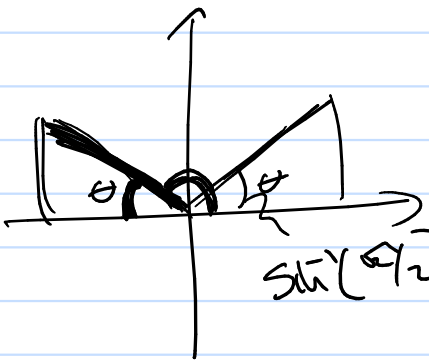
$$\sin(3x+1) = \sqrt{2}/2$$

(not in table?
or
you don't remember the table?)



$$\sin(3x+1) = \sqrt{2}/2$$

$$3x+1 = \sin^{-1}(\sqrt{2}/2)$$



$\sin^{-1}(\sqrt{2}/2)$ in QI

QII $\pi - \sin^{-1}(\sqrt{2}/2)$

$$3x+1 = \sin^{-1}(\sqrt{2}/2) \quad \text{or} \quad 3x+1 = \pi - \sin^{-1}(\sqrt{2}/2)$$

So

$$3x+1 = \boxed{\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)} + 2n\pi \quad \text{or} \quad 3x+1 = \pi - \sin^{-1}(\sqrt{2}/2) + 2n\pi$$

Solve

(finish)

both sin( ) and cos( ) are done as above.

(1) Isolate
(2) Table? or Inverse?
(3) Solve w/(a) understanding repeats.
(5) unit circle and quadrants.

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sec( ) and csc( ) with their domain problems.

(A) use $\sec(\square) = \frac{1}{\cos(\square)}$

use $\csc(\square) = \frac{1}{\sin(\square)}$

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tan( ) with its domain problems.

(1) Isolate tan( )

(2) use table or arctan( )

(3) Solve w/(a) understanding repeats. $+n\pi$
(5) unit circle and quadrants.

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type polynomial like equations. -

(ex) $\sin^2(x) + \sin(x) - 6 = 0$

let $u = \sin(x)$

$$u^2 + u - 6 = 0$$