Math 112

Q's

2 Find the exact value of each expression if defined; **otherwise, input undefined.**

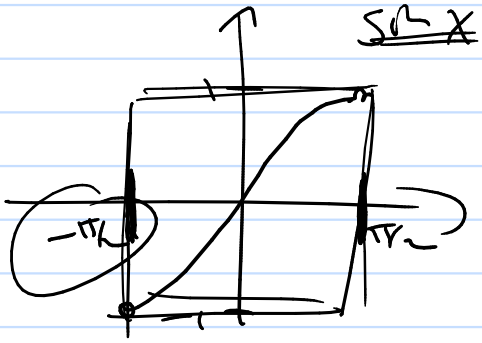
(a) $\sin^{-1}\frac{\sqrt{2}}{2} =$ _____ degrees.

(b) $\cos^{-1}\frac{\sqrt{2}}{2} =$ _____ degrees.

(c) $\cos^{-1}(-\frac{\sqrt{2}}{2}) =$ _____ degrees. $\cos^{-1}(\#) = \text{angle}$

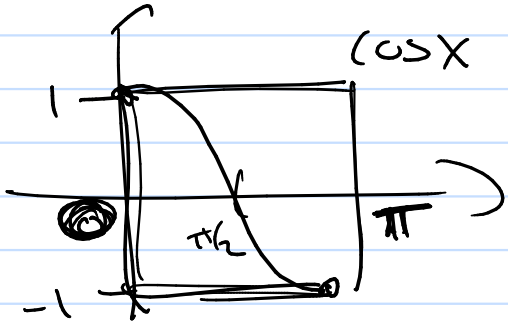
(d) $\sin^{-1}(-\frac{\sqrt{2}}{2}) =$ _____ degrees. $\sin^{-1}(\#) = \text{angle}$

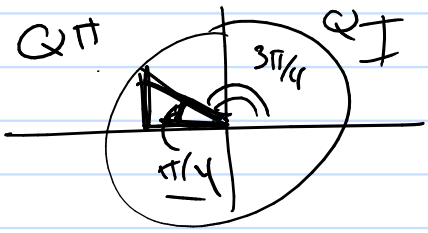
θ	$\sin(\theta)$	$\cos(\theta)$	$\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$
0	0	1	0
$\pi/6$	$1/2$	$\sqrt{3}/2$	$\sqrt{3}/3$
$\pi/4$	$\sqrt{2}/2$	$\sqrt{2}/2$	1
$\pi/3$	$\sqrt{3}/2$	$1/2$	$\sqrt{3}$
$\pi/2$	1	0	—



$\sin^{-1}(-\sqrt{2}/2) = -\pi/4$

$\cos^{-1}(-\sqrt{2}/2) = 3\pi/4$

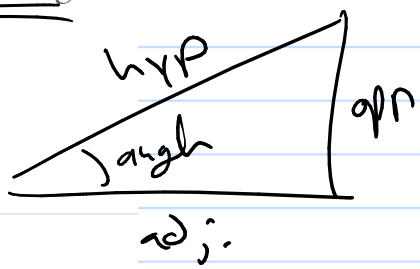




10 Find the exact value (NO DECIMALS) of each expression by sketching a triangle:

(a) $\sin(\tan^{-1}\frac{12}{5}) =$ _____ .

(b) $\tan(\cos^{-1}\frac{5}{13}) =$ _____ .



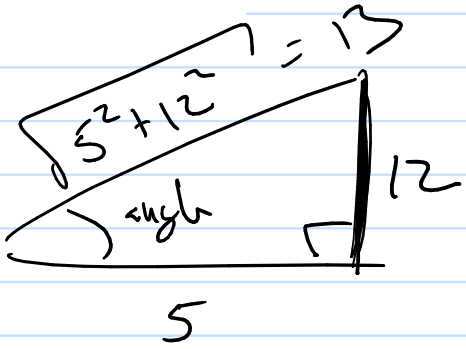
11 Rewrite the expression as an algebraic expresion in x:

$\tan(\sin^{-1}x) =$ _____ .

$\sin\left(\tan^{-1}\left(\frac{12}{5}\right)\right) = \frac{12}{13}$

① inv. of tangent

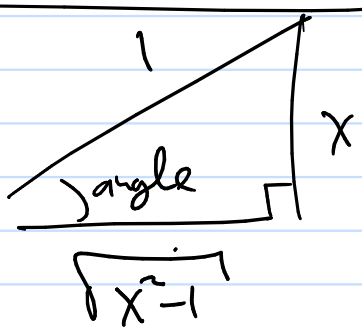
② ratio



$\cot\left(\tan^{-1}\left(\frac{12}{5}\right)\right) = \frac{5}{12}$

ex $\tan\left(\sin^{-1}\left(\frac{x}{1}\right)\right)$

$= \frac{x}{\sqrt{x^2-1}}$

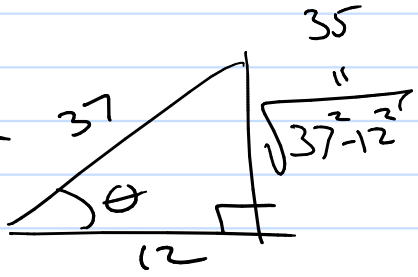


8 Find the exact value.

$\sin\left(2\cos^{-1}\left(\frac{12}{37}\right)\right)$ = ease of visual ←

$\sin(2\theta) = 2\sin\theta\cos\theta$

↑ angle = θ



$\sin\left(2\cos^{-1}\left(\frac{12}{37}\right)\right) = 2\sin\left(\cos^{-1}\left(\frac{12}{37}\right)\right)\cos\left(\cos^{-1}\left(\frac{12}{37}\right)\right)$

$\sin(2\theta) = 2\sin(\theta)\cos(\theta)$

$$2\left[\frac{35}{37}\right]\left[\frac{12}{37}\right] =$$

Trig Equations

(If possible) Isolate the trig function.

(ex) $10\sin^{-1}(x+2) - 3 = 1$

$\sin^{-1}(x+2) = \frac{2}{5}$

$x+2 = \sin\left(\frac{2}{5}\right)$

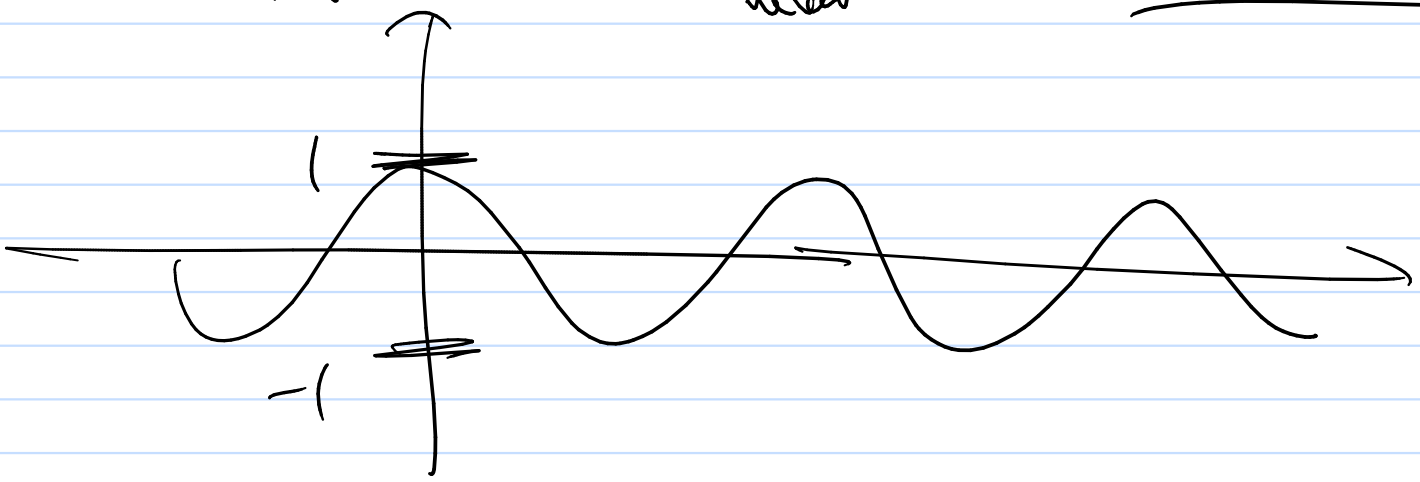
$x = \sin\left(\frac{2}{5}\right) - 2$

(ex) $\cos^2 x + \cos x = 12$ polynomial like

$\cos^2 x + \cos x - 12 = 0$

$(\cos x + 4)(\cos x - 3) = 0$

$\cos x = -4$ never ↑ $\quad \cos x = 3$ never ↑ So **No Solution**



$\cos(2x) + \cos x + 1 = 0$

$\cos(2x) = \cos^2 x - \sin^2 x$
$= 1 - 2\sin^2 x$
$= 2\cos^2 x - 1$ ✓

$(2\cos^2 x - 1) + \cos x + 1 = 0$

$2\cos^2 x + \cos x = 0$

$(\cos x)(2\cos x + 1) = 0$

$2\cos x + 1 = 0$

$\cos x = -1/2$

$\cos x = 0$ (at $(1, 0)$)

$x = \pi/2 + n\pi$

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

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