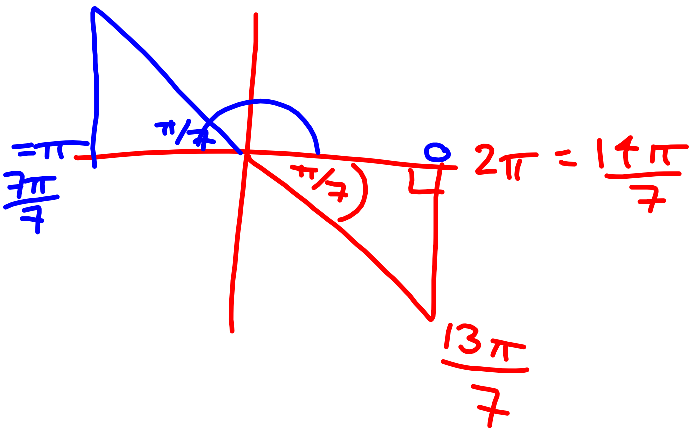
Turn in Homework #6

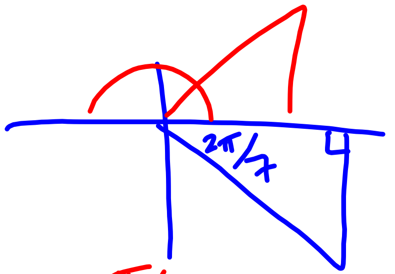
- 6.1 #1-69 odd (proofs)
- 6.2 #1-41 odd
- 6.3 #1-24 all; 30-36 all; 49-93 odd

$$\cot^{-1}\left(\cot\frac{13\pi}{7}\right) = \boxed{\frac{6\pi}{7}}$$

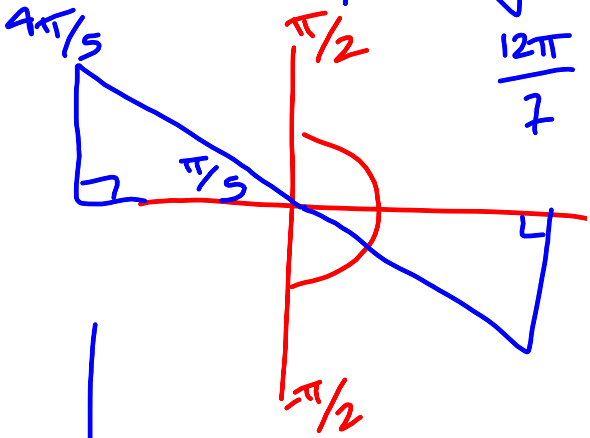


Evaluate:

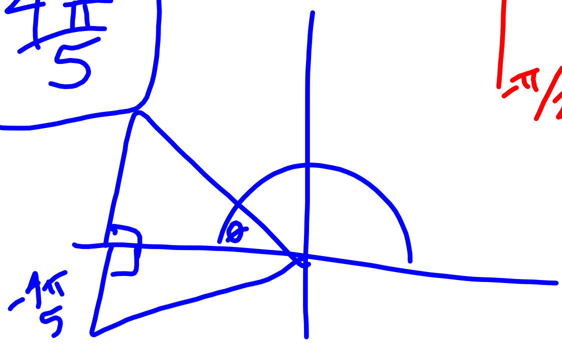
$$\cos^{-1}\left(\cos\left(\frac{12\pi}{7}\right)\right) = \boxed{\frac{2\pi}{7}}$$



$$\tan^{-1}\left(\tan\left(\frac{4\pi}{5}\right)\right) = \boxed{-\frac{\pi}{5}}$$



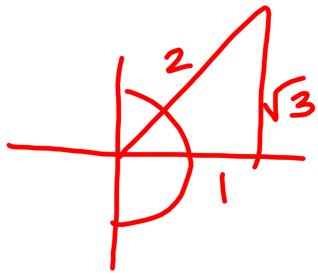
$$\sec^{-1}\left(\sec\left(-\frac{4\pi}{5}\right)\right) = \boxed{\frac{4\pi}{5}}$$



Inverse Trig Functions, cont.

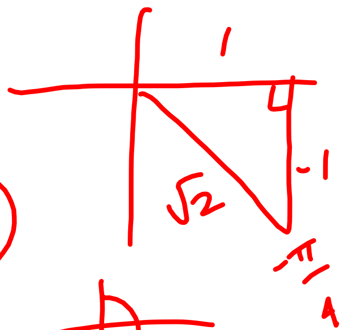
1. $\cos\left(\underbrace{\sin^{-1}\frac{\sqrt{3}}{2}}\right) = \cos 60^\circ$

$= \boxed{\frac{1}{2}}$

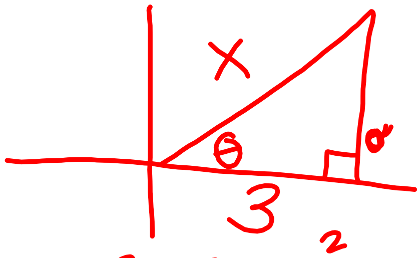


2. $\sin^{-1}\left[\underbrace{\tan\left(\frac{-\pi}{4}\right)}\right] = \sin^{-1}(-1)$

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



3. $\tan\left(\underbrace{\cos^{-1}\frac{3}{x}}_{\theta}\right)$ $x>0$



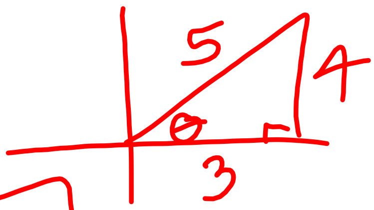
$= \boxed{\dfrac{\sqrt{x^2-9}}{3}}$

$3^2+a^2=x^2$

$a^2=x^2-9$

$a=\sqrt{x^2-9}$

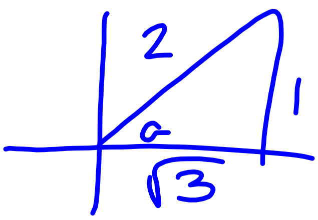
4. $\sin\left(\underbrace{2\cos^{-1}\frac{3}{5}}_{\theta}\right)$



$\sin 2\theta = 2\sin\theta\cos\theta$

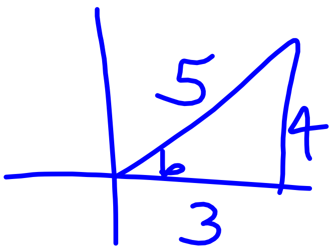
$= 2\left(\frac{4}{5}\right)\left(\frac{3}{5}\right) = \boxed{\dfrac{24}{25}}$

5. $\sin\left(\underbrace{\sin^{-1}\frac{1}{2}}_{a} + \underbrace{\cos^{-1}\frac{3}{5}}_{b}\right)$



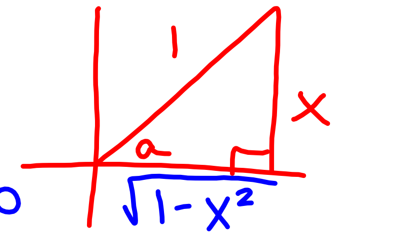
$\sin(a+b) = \sin a\cos b + \cos a\sin b$

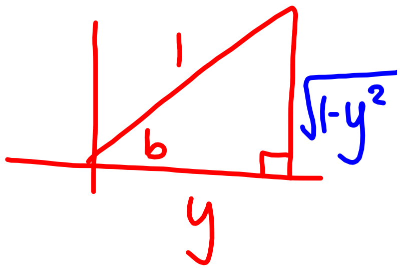
$= \left(\frac{1}{2}\right)\left(\frac{3}{5}\right) + \left(\frac{\sqrt{3}}{2}\right)\left(\frac{4}{5}\right)$



$= \boxed{\dfrac{3+4\sqrt{3}}{10}}$

6. $\cos\left(\underbrace{\sin^{-1}\frac{x}{1}}_{a} - \underbrace{\cos^{-1}\frac{y}{1}}_{b}\right)$ $x,y>0$





$\cos(a-b) = \cos a\cdot\cos b + \sin a\cdot\sin b$

$= \left(\frac{\sqrt{1-x^2}}{1}\cdot\frac{y}{1}\right)+\left(\frac{x}{1}\cdot\frac{\sqrt{1-y^2}}{1}\right)$

$= \boxed{y\sqrt{1-x^2}+x\sqrt{1-y^2}}$

(Other Trig/Precal Text) Restricted domains:

$(-\frac{\pi}{2},\frac{\pi}{2})$: sin, csc, tan; $(0,\pi)$: cos, sec, cot

39. $\cos^{-1}\left(\cos\left(\frac{-\pi}{4}\right)\right) = \boxed{\frac{\pi}{4}}$

47. $\tan\left(\cos^{-1}\left(\frac{\sqrt{2}}{2}\right)\right)$ $=\frac{1}{\sqrt{2}}$

$= \boxed{1}$

41. $\sin^{-1}\left(\sin\frac{\pi}{5}\right) = \boxed{\frac{\pi}{5}}$

53. $\sin^{-1}\left(\sin\frac{7\pi}{6}\right)$

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

43. $\tan^{-1}\left(\tan\frac{2\pi}{3}\right) = \boxed{\frac{-\pi}{3}}$

55. $\sin\left(\tan^{-1}\frac{a}{3}\right)$ $a>0$

$= \boxed{\frac{a}{\sqrt{a^2+9}}}$

45. $\sin\left(\tan^{-1}\left(\frac{\sqrt{3}}{3}\right)\right) = \boxed{\frac{1}{2}}$ $= \frac{1}{\sqrt{3}}$

63. $\cos\left(\sin^{-1}\frac{\sqrt{2}}{2}+\cos^{-1}\frac{3}{5}\right)$

$\frac{\sqrt{2}}{2}\cdot\frac{3}{5} - \frac{\sqrt{2}}{2}\cdot\frac{4}{5} = \boxed{\frac{-\sqrt{2}}{10}}$

6.6

Solving Trigonometric Equations

evaluate the expression $\sin^{-1}\left(\frac{1}{2}\right)$ versus solve the equation $\sin x = \frac{1}{2}$

one solution; $\frac{\pi}{6}$

infinitely many solutions;

$\frac{\pi}{6} + 2\pi k, \ k \in \mathbb{Z}$

$\frac{5\pi}{6} + 2\pi k, \ k \in \mathbb{Z}$

$\in$ = "is an element of"

$\mathbb{Z}$ = "the set of integers"

Homework for Test #3:

Homework #6 (submitted Wed. 01/15)

- 6.1 #1-69 odd (proofs)
- 6.2 #1-41 odd
- 6.3 #1-24 all; 30-36 all; 49-93 odd

Homework #7 (due Wednesday?)

- **6.5 #1-24 all; 25-55 odd**
- **6.6 #1-21 odd - finding solutions between 0 and 2pi**
- **6.6 #61-69 odd - finding all possible solutions (+2pi*k)**

Test #3 - Thursday 01/23?