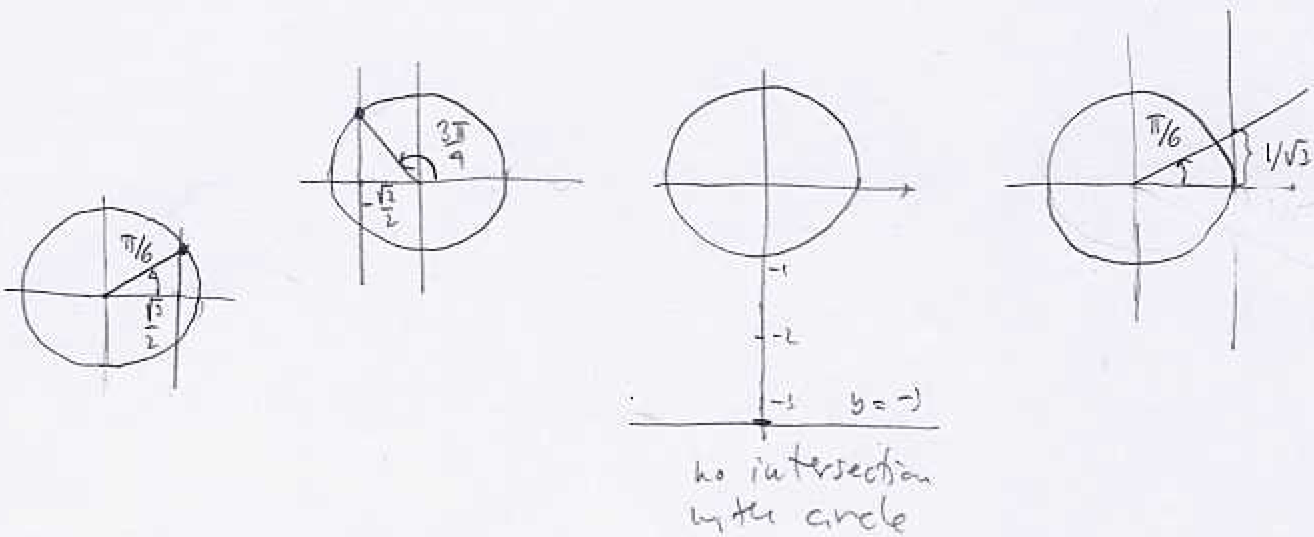
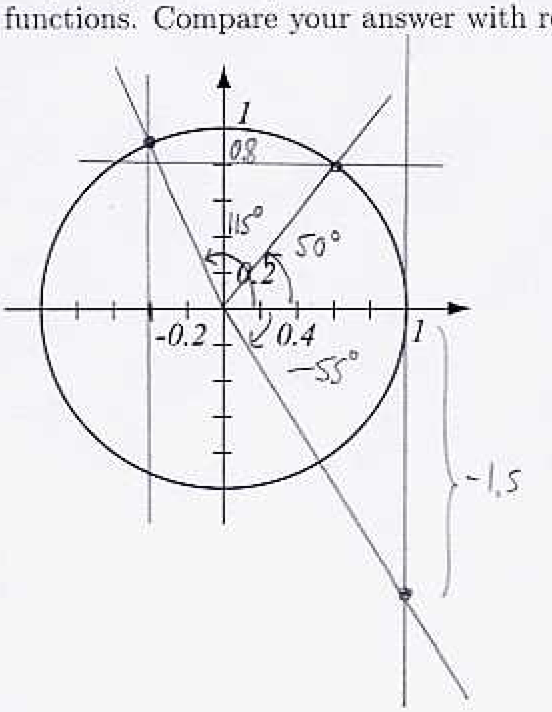
Spring '06/MAT 145/Worksheet 4 **Name:** Solution *Show all your work.*

1. (8pts) Without using the calculator, find the exact values (in radians) of the following expressions. Draw the unit circle to help you.

$\arccos \frac{\sqrt{3}}{2} = \frac{\pi}{6}$ $\arcsin\left(-\frac{\sqrt{2}}{2}\right) = \frac{3\pi}{4}$ $\arcsin(-3) =$ not defined $\arctan \frac{1}{\sqrt{3}} = \frac{\pi}{6}$



2. (6pts) Use the picture below to estimate (in degrees) the values of inverse trigonometric functions. Compare your answer with results you get with a calculator.



	estimate	calculator
$\arcsin 0.8 =$	$50°$	$53.13°$
$\arccos(-0.4) =$	$115°$	$113.58°$
$\arctan(-1.5) =$	$-55°$	$-56.31°$

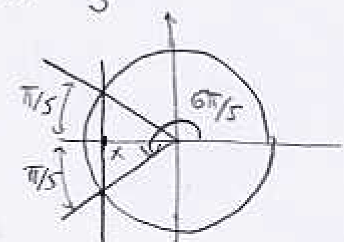
3. (5pts) Simplify the following expressions without using the calculator. For some of them, you will need a picture.

$\sin(\arcsin(0.83)) =$ 0.83

$\arctan\left(\tan\frac{2\pi}{7}\right) =$ $\frac{2\pi}{7}$ since $\frac{2\pi}{7}$ is btw. $-\frac{\pi}{2}, \frac{\pi}{2}$

$\arccos\left(\cos\frac{6\pi}{5}\right) =$ $\arccos x = \frac{4\pi}{5}$

$\frac{6\pi}{5}$ not btw $0, \pi$

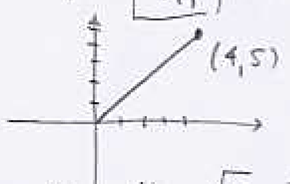


4. (7pts) Evaluate the following expressions exactly. Draw the appropriate picture.

$\sin\left(\arctan\frac{5}{4}\right) =$ $\sin\theta = \frac{y}{r} = \boxed{\frac{5}{\sqrt{41}}}$

$\tan\theta = \frac{5}{4} = \frac{y}{x}$

θ btw. $-\frac{\pi}{2}, \frac{\pi}{2}$



$r^2 = 4^2 + 5^2$

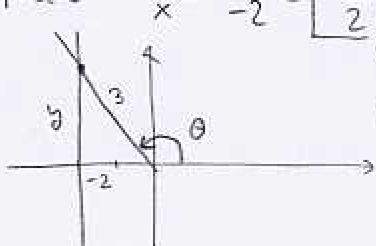
$r^2 = 16 + 25 = 41$

$r = \sqrt{41}$

$\tan\left(\arccos\left(-\frac{2}{3}\right)\right) =$ $\tan\theta = \frac{y}{x} = \frac{\sqrt{5}}{-2} = \boxed{-\frac{\sqrt{5}}{2}}$

$\cos\theta = -\frac{2}{3} = \frac{x}{r}$

θ btw. $0, \pi$



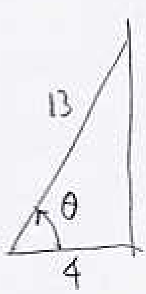
$(-2)^2 + y^2 = 3^2$

$(-2)^2 + y^2 = 9$

$y^2 = 5$

$y = \pm\sqrt{5}$ $\quad$ $y = \sqrt{5}$ since pt. is above x-axis

5. (4pts) A 13ft ladder is leaning against the wall. If its bottom is 4ft away from the wall, what is the angle (in degrees) between the ladder and the ground?



$\cos\theta = \frac{4}{13}$

$\theta = \arccos\frac{4}{13}$

$\theta = 72.08°$