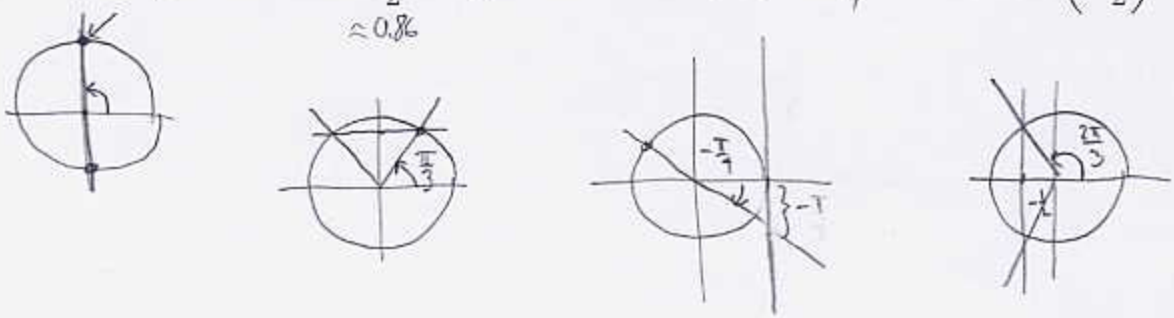
Fall '07/MAT 150/Worksheet 9 **Name:** Solution *Show all your work.*

1. (8pts) Without using the calculator, find the exact values of the following inverse trigonometric functions. Draw the unit circle and the appropriate angle.

$\arccos 0 = \frac{\pi}{2}$ $\arcsin \frac{\sqrt{3}}{2} = \frac{\pi}{3}$ $\arctan(-1) = -\frac{\pi}{4}$ $\arccos\left(-\frac{1}{2}\right) = \frac{2\pi}{3}$

≈ 0.8



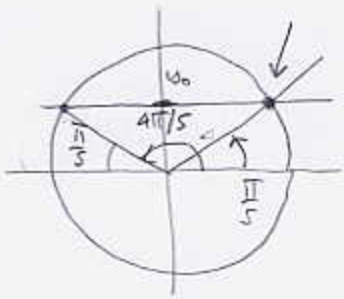
2. (5pts) Find the exact values of the expressions below. Use a picture if necessary, but do not use the calculator.

$\tan(\arctan 37) =$ 37

$\arcsin\left(\sin\left(\frac{4\pi}{5}\right)\right) =$ $\arcsin y_0 = \frac{\pi}{5}$

$\sin\frac{4\pi}{5} = y_0$

not in $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$



3. (4pts) Find the exact value of the expression below. Draw a picture and do not use the calculator.

$\cot\left(\arccos\left(-\frac{2}{7}\right)\right) =$ $\frac{x}{y} = \frac{-2}{\sqrt{45}} = -\frac{2}{3\sqrt{5}}$

$\cos\theta = -\frac{2}{7} = \frac{-2}{7} = \frac{x}{r}$ θ in $[0,\pi]$

$(-2)^2 + y^2 = 7^2$

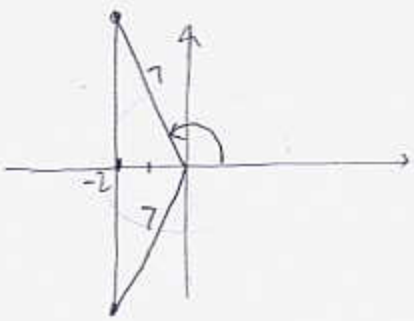
$4 + y^2 = 49$

$y^2 = 45$

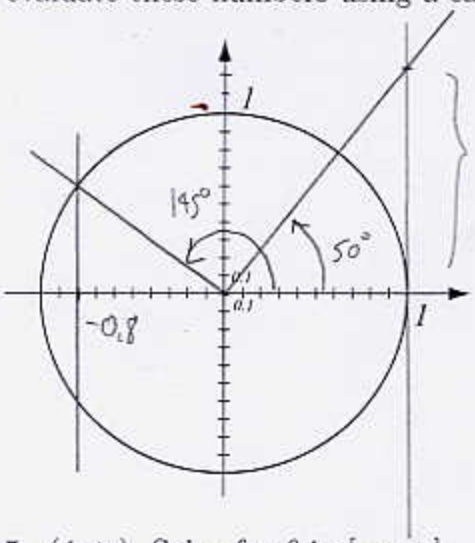
$y = \pm\sqrt{45}$

need $y = \sqrt{45}$ (θ is in $[0,\pi]$)

$= 3\sqrt{5}$



4. (4pts) Use the picture below to estimate (in degrees) $\arccos(-0.8)$ and $\arctan(1.2)$. Then evaluate these numbers using a calculator and compare your answers.



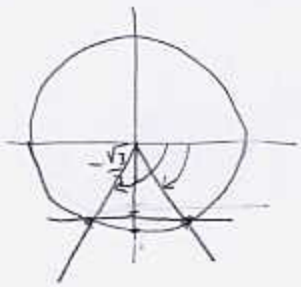
	est.	calculator
$\arccos(-0.8) \approx$	$145°$	$143.13°$
$\arctan 1.2 \approx$	$50°$	$50.19°$

5. (4pts) Solve for θ in $[-\pi, \pi]$.

$2\sin\theta + \sqrt{3} = 0$

$2\sin\theta = -\sqrt{3}$

$\sin\theta = -\frac{\sqrt{3}}{2}$



$\theta = -\frac{\pi}{3}, -\frac{2\pi}{3}$

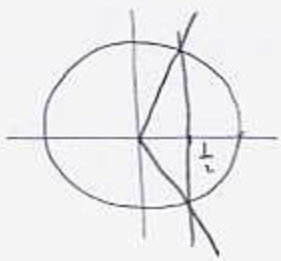
need only angles in $[-\pi, \pi]$

6. (5pts) Find all the solutions of $\cos(5\theta) = \frac{1}{2}$.

$\cos(5\theta) = \frac{1}{2}$

$5\theta = \frac{\pi}{3} + k \cdot 2\pi$

or $-\frac{\pi}{3} + k \cdot 2\pi$



$\theta = \frac{\pi}{15} + k \cdot \frac{2\pi}{5}$

k an integer

$\theta = -\frac{\pi}{15} + k \cdot \frac{2\pi}{5}$