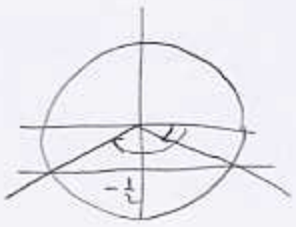
Spring '06/MAT 145/Worksheet 6 **Name:** Solution *Show all your work.*

1. (4pts) Solve the equation (give a general formula for all the solutions).

$2\sin\theta + 1 = 0$

$2\sin\theta = -1$

$\sin\theta = -\frac{1}{2}$



$\theta = -\frac{\pi}{6} + k\cdot 2\pi$

$\theta = -\frac{5\pi}{6} + k\cdot 2\pi$

2. (8pts) Solve the equation and give a general formula for all the solutions. Then list all the solutions that fall in the interval $-\frac{3\pi}{2} \le \theta \le \frac{3\pi}{2}$.

$\cos(2\theta) = \frac{\sqrt{2}}{2}$

$2\theta = \frac{\pi}{4} + k\cdot 2\pi$ or $2\theta = -\frac{\pi}{4} + k\cdot 2\pi$

$\theta = \frac{\pi}{8} + k\pi$ $\theta = -\frac{\pi}{8} + k\cdot\pi$

k	0	1	−1	2	−2
θ	$\frac{\pi}{8}$	$\frac{9\pi}{8}$	$-\frac{7\pi}{8}$	$\frac{17\pi}{8}$	$-\frac{15\pi}{8}$

not in interval

k	0	1	−1	2	−2
θ	$-\frac{\pi}{8}$	$\frac{7\pi}{8}$	$-\frac{9\pi}{8}$	$\frac{15\pi}{8}$	$-\frac{17\pi}{8}$

not in interval

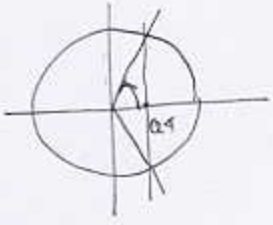
$\theta = \frac{\pi}{8}, \frac{7\pi}{8}, \frac{9\pi}{8}, -\frac{\pi}{8}, -\frac{7\pi}{8}, -\frac{9\pi}{8}$

3. (5pts) Use your calculator to solve the equation on the interval $0 \le \theta \le 2\pi$. Round answers to two decimal places (answers in radians).

$\cos\theta = 0.4$

$\theta = \arccos 0.4 = 1.16$

$\theta = 2\pi - \arccos 0.4 = 5.12$



4. (7pts) Solve the equation (give a general formula for all the solutions).

$2\sin^2\theta + 11\sin\theta - 6 = 0$

$2x^2 + 11x - 6 = 0$

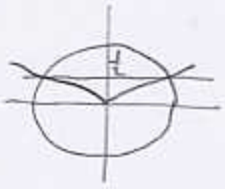
$$x = \frac{-11 \pm \sqrt{11^2 - 4\cdot 2(-6)}}{2\cdot 2}$$

$$= \frac{-11 \pm \sqrt{121+48}}{4}$$

$$= \frac{-11 \pm \sqrt{169}}{4}$$

$$= \frac{-11 \pm 13}{4} = \frac{1}{2}, -6$$

$\sin\theta = \frac{1}{2}$ $\qquad$ $\sin\theta = -6$



no intersection

$\theta = \frac{\pi}{6} + k\cdot 2\pi$

$\theta = \frac{5\pi}{6} + k\cdot 2\pi$

no solution

5. (6pts) Solve the equation on the interval $0 \le \theta \le 2\pi$.

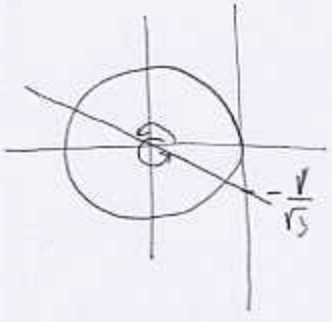
$\sqrt{3}\sin\theta + \cos\theta = 0$

$\sqrt{3}\sin\theta = -\cos\theta \quad | \pm\cos\theta$

$$\frac{\sqrt{3}\sin\theta}{\cos\theta} = -1 \quad | \div\sqrt{3}$$

$$\frac{\sin\theta}{\cos\theta} = -\frac{1}{\sqrt{3}}$$

$$\tan\theta = -\frac{1}{\sqrt{3}}$$



$\theta = \frac{5\pi}{6}, \frac{11\pi}{6}$