**SLU PreCalculus Quiz 8 Fall 2007**

NAME: ______________________________________ Score______________________________/10

Please **print** your name

1. The process of solving an equation (for x) reveals cos(x) = 1.707107 or cos(x) = 0.292893.
Find all solutions of the equations. Hint: This is best accomplished with a calculator.

Solution:

The first observation is cos(x) = 1.707107 has no solution because 1.707107 is not in the range of cos.

**Remember the range of cos is [-1, 1].**

From cos(x) = 0.292893 we obtain

$x_1 = \cos^{-1}(\cos(x)) = \cos^{-1}(0.292893) = 72.968764 \approx 73^\circ$

$x_2 = 360 - 73 = 287^\circ$

Because the period of cos is 360°, all solutions are given by

$$x = \begin{cases} 73^\circ + k360^\circ \\ 287^\circ + k360^\circ \end{cases}$$

2. Find exact solutions of the equation $\sin^2(x) + 2\cos(x) = -2$ for $0^\circ \le x < 360^\circ$

Solution:

$\sin^2(x) + 2\cos(x) = -2$

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

$-\cos^2(x) + 2\cos(x) + 3 = 0$

$\cos^2(x) - 2\cos(x) - 3 = 0$

$(\cos(x) - 3)(\cos(x) + 1) = 0$

By the Zero Factor Property

$\cos(x) - 3 = 0$ OR $\cos(x) + 1 = 0$

$\cos(x) = 3$ OR $\cos(x) = -1$

Because 3 is not in the range of cos, cos(x) = 3 has no solution.

The only solution of cos(x) = -1 in the interval [0°, 360°] is 180°.