Name: _____

College Algebra: Quiz #5 (Solutions)

1. Find all solutions of the following equation.

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

Solution: We can try factoring this equation, but there are no two integers whose sum is 6 and whose product is 6. Instead we will use the quadratic formula as follows.

$$\begin{aligned} x &= \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \\ &= \frac{-6 \pm \sqrt{(6)^2 - 4(1)(6)}}{2} \\ &= \frac{-6 \pm \sqrt{12}}{2} \\ &= \frac{-6 \pm 2\sqrt{3}}{2} \\ &= -3 \pm 1\sqrt{3} \end{aligned}$$

Thus $\boxed{x = -3 \pm 1\sqrt{3}}$.

2. Find all solutions of the following inequality.

$$|-2x - 4| + 8 \geq 22$$

Solution: First, solve for the absolute value expression by subtracting 8 from both sides.

$$|-2x - 4| \geq 14.$$

This is an absolute value inequality of the form "absolute value greater than", so we can now rewrite as a compound inequality as follows.

$$-2x - 4 \geq 14 \quad \text{OR} \quad -2x - 4 \leq -14.$$

Solving each of these for x, we have

$$x \geq 5 \quad \text{OR} \quad -9 \geq x.$$

(Remember to change the direction of the inequality when dividing by -2!) In interval notation, the solution is $\boxed{(-\infty, -9] \cup [5, \infty)}$.