Name: _____

College Algebra: Quiz #11 (Solutions)

1. Find the domain of the following function.

$$f(x) = \sqrt{|3x+6| - 3}$$

Solution: Remember that two bad things can happen which may cause a number *not* to be in the domain of a function; variables in denominators and variables in radicals. Here we have a variable in a radical. This function will be defined as long as the expression in the radical is nonnegative. That is, at all solutions of the inequality

$$|3x+6| - 3 \geq 0.$$

This is an absolute value inequality. Solving for the absolute value, we have

$$|3x+6| \geq 3.$$

This inequality can then be split into two like so:

$$3x+6 \geq 3 \quad \text{OR} \quad 3x+6 \leq -3.$$

The solution of this inequality is

$$x \geq -1 \quad \text{OR} \quad x \leq -3.$$

So the domain of f is

$$\boxed{\text{all real numbers } x \text{ such that } x \geq -1 \text{ or } x \leq -3.}$$