MAT 104 Quiz 2  
Friday, February 11, 2005

1. (a) Solve the inequality below and write your answer in set builder notation.

\[ 3 - x \geq 7 - 3x \]

\[ 3 - x \geq 7 - 3x \implies 3 + 2x \geq 7 \]
\[ \implies 2x \geq 4 \]
\[ \implies x \geq 2 \]

So the solution set is \( \{x \mid x \geq 2\} \)

(b) Write your answer in interval notation.

\([2, \infty)\)

(c) Indicate your solution on the number line below.

| -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |

2. Solve the following inequality:

\[ |2x + 3| \geq 3 \]

First split this as two inequalities. Remember, this is saying that we want the expression \((2x + 3)\) to live at least 3 units away from 0. To be that far from zero, the expression can be to the right of 3 (greater than or equal to 3), or to the left of -3 (less than or equal to -3). So we have

\[ 2x + 3 \geq 3 \] or \[ 2x + 3 \leq -3 \]

Solving each of these inequalities individually, we get

\[ x \geq 0 \] or \[ x \leq -3 \]

3. For the function \( f \) given by \( f(x) = x^2 + x - 3 \), find

(a) \( f(2) = (2)^2 + 2 - 3 = 4 + 2 - 3 = 3 \)
(b) \( f(-1) = (-1)^2 + (-1) - 3 = 1 - 1 - 3 = -3 \)
(c) \( f(a) = a^2 + a - 3 \)
4. Graph the equation $y = 2x + 1$ on the coordinate plane below.

5. Graph the equation $2x + 3y = 6$ on the coordinate plane below.