Do I need to graph $f(x) = x^2 - x - 12$ to know when the function is below the x-axis (negative), or above the x-axis (positive)?

Solving a Quadratic Inequality

Step 1: Solve the corresponding quadratic equation

Step 2: Identify the intervals determined by the solutions of the equation

Step 3: Use a test value from each interval to determine which intervals form the solution set

1. Solve the following:
   a. $x^2 - x - 12 < 0$

   b. $2x^2 + 5x - 12 \geq 0$

2. If a projectile is launched from ground level with an initial velocity of 96 ft per sec, its height s in feet t seconds after launching is given by the following equation, $s = -16t^2 + 96t$. When will the projectile be greater than 80 ft above ground level?

Solving a Rational Inequality

Step 1: Rewrite the inequality, if necessary, so that 0 is on one side and there is a single fraction on the other side.

Step 2: Determine the values that will cause either the numerator or the denominator to equal 0.

*These are the values to consider on the number line

Step 3: Use a test value from each interval to determine which intervals form the solution set.

Caution:

- a value causing a denominator to equal zero is not in the solution
- A value causing the numerator to equal zero will be included in the solution if the inequality is "equal to"

3. Solve the following:
   a. $\frac{2}{x-3} \geq 0$

b. $\frac{5}{x+4} \geq 1$

c. $\frac{2x-1}{3x+4} < 5$

d. $\frac{5}{x+1} > \frac{12}{x+1}$