MATH 11010:   Nonlinear Inequalities
Section 3.6

Guidelines for solving nonlinear inequalities:

1. Move all terms to one side of the inequality. (If dealing with rational expressions, get a common denominator.)

2. Factor completely.

3. Set each factor equal to zero. These numbers divide the real number line into intervals.

4. Make a sign chart by dividing the real number line into the intervals found in Step 3.

5. In each interval, use a test value to determine the sign (positive or negative) of the product or quotient in that interval.

6. Determine the solution of the inequality by examining the sign values. Be sure to check whether the inequality is satisfied at some or all of the endpoints.

Common Mistakes to Avoid:

- Be careful with the endpoints. Make sure not to include any endpoints which would make the denominator zero in a rational inequality.

- Do NOT assume that the signs will always alternate.

- Do NOT assume that the first interval is always positive.

Example 1: Solve: $x^2 - x - 6 < 0$

Example 2: Solve: $x^3 < 4x^2$

Example 3: Solve: $x^3 + x^2 - 4x - 4 \geq 0$

Example 4: Solve: $\dfrac{2x^2 - x - 3}{x + 5} \leq 0$

Example 5: Solve: $\dfrac{x + 1}{x - 2} + \dfrac{x - 3}{x - 1} \geq 0$

Homework: pp 327–328; #15–31 odd, #37–49 odd, # 53, #59