Mini-Lecture 4.4
Polynomial and Rational Inequalities

Learning Objectives:

1. Solve polynomial inequalities
2. Solve rational inequalities

Examples:

1. Solve each polynomial inequality.

$(a)\ (x+3)^2(x-4)>0$ $\qquad$ $(b)\ (x+1)(x-5)(x+3)\le 0$

$(c)\ x^6>16x^4$ $\qquad\qquad$ $(d)\ x^3+2x^2-8x\le 0$

2. Solve each rational inequality.

$(a)\ \dfrac{(x+3)^2}{x^2-4}\ge 0$ $\qquad\qquad$ $(b)\ \dfrac{2x-1}{x+4}\le 2$

$(c)\ \dfrac{x^2(x+3)(x-5)}{(x+2)(x-4)}\ge 0$ $\qquad$ $(d)\ \dfrac{2}{x-1}>\dfrac{3}{x+2}$

Teaching Notes:

- A sign chart can also be helpful in solving these inequalities.
- Using test numbers can be difficult if the roots are close together. The students will not always calculate correctly.
- If you are using a graphing calculator in class, then this is a good section to use that technology in the presentation. Graphic representation gives the students a clearer idea. The Table feature is a great way to calculate test values.

Answers:

1. $(a)\ (4,\infty)$ $\quad$ $(b)\ (-\infty,-3]\cup[-1,5]$ $\quad$ $(c)\ (-\infty,-4)\cup(4,\infty)$ $\quad$ $(d)\ (-\infty,-4]\cup[0,2]$

2. $(a)\ (-\infty,-2)\cup(2,\infty)$ $\qquad\qquad$ $(b)\ (-4,\infty)$
$(c)\ (-\infty,-3]\cup(-2,4)\cup[5,\infty)$ $\quad$ $(d)\ (-\infty,-2)\cup(1,7)$