4.3 Solving Polynomial Inequalities

A Sign Chart Method Use a *sign chart* to specify the sign of each factor and then combine them to find the sign of the whole factored polynomial.	Ex 1. Use a sign chart to solve each inequality. a) $x(x-1) \le 0$ b) $(x^2-x-2)(x^2+1)(x-3)^3 \ge 0$
B Substitution Method To find the sign of the polynomial expression on each interval, chose conveniently a number in that interval and evaluate the function.	Ex 2. Use a substitution to solve the following inequality. $x^2(x^2-4)(x+1) > 0$
C Graphical Method Graph the factored polynomial and then conclude about its sign.	Ex 3. Use the graphical method to solve each inequality. a) $x(x-1)(x+2) > 0$ b) $(x^4-1)(x^2-9) \le 0$

D Algorithm to Solve Polynomial Inequalities

In order to solve an inequality involving a polynomial expression:

- Move all terms to one side of inequality
- Factor the polynomial
- Use the sign chart or the graphical method to find the sign of the polynomial
- Write the solution set

Ex 4. Solve for x.

a) $(x+1)^2 \le (x-2)^3 + 5$

b) $(x-1)^4 + 8x > 4(x^2+1)$

E Technology

When the polynomial inequality is not factorable, use technology to find the solution set.

Ex 5. A box with an open top is to be constructed from a square piece of cardboard, $2\,m$ wide, by cutting out a square, of side length x, from each of the four corners and bending up the sides. Find x such that the volume of the box is between $0.3\,m^3$ and $0.5\,m^3$.

Reading: Nelson Textbook, Pages 219-225
Homework: Nelson Textbook, Page 226: #5, 6d, 7df, 8, 9, 10, 11, 17, 18