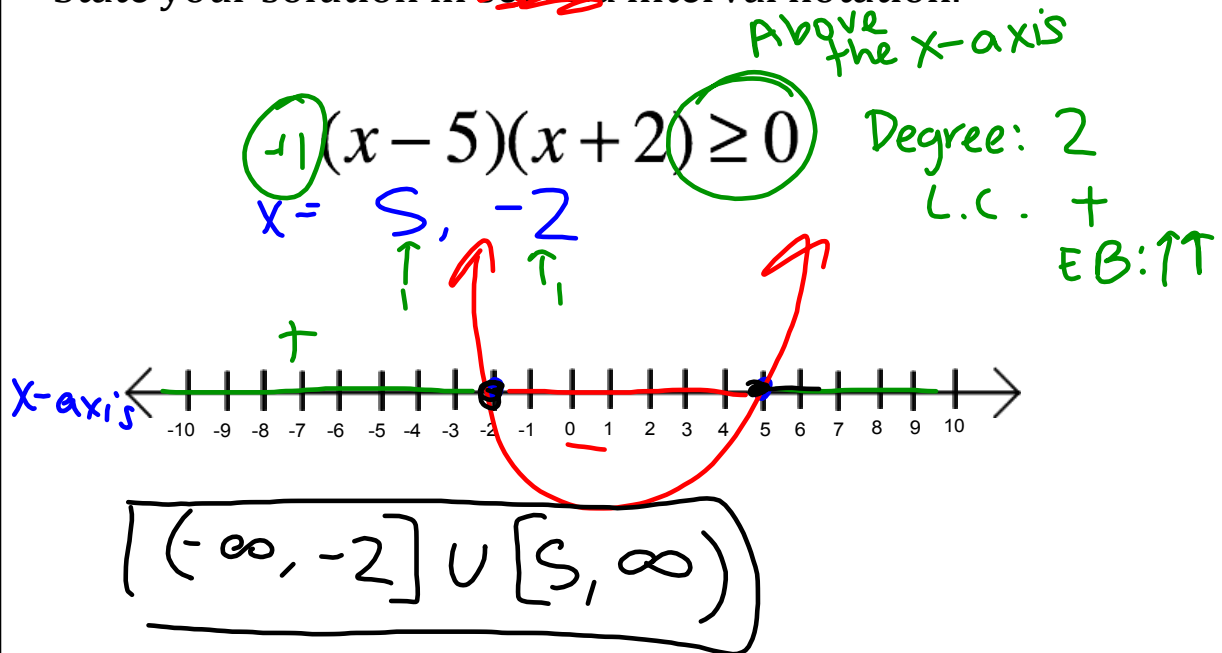


3-4 Solving Inequalities

Objective: Students can solve polynomial inequalities.

Recall from last year.

Solve the following inequalities. Graph your solution.
State your solution in ~~set~~ interval notation.



Solving Inequalities for Polynomials

1. Find ~~Boundary Points~~

↳ the zeros

2. Find Solution Intervals

Make a sign chart ^{graph} to be more efficient and use multiplicity rules and end behavior models.

Key concepts

End behavior Based on Degree

Even: Matching

Odd: Opposite

Multiplicity → for each factor

Even Tangent (Bounce)

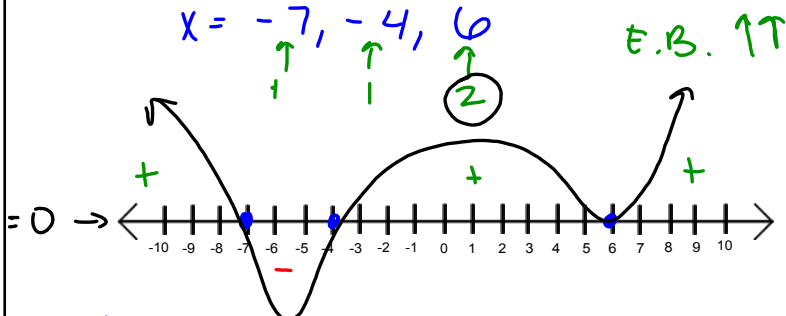
Odd > 1 Inflection (Slide)

1 Straight

Determine the x-values that cause the polynomial to be a) zero b) positive c) negative

$$f(x) = (x+7)(x+4)(x-6)^2$$

$$x = -7, -4, 6$$



a) zero at $x = -7, -4, 6$

b) positive: $(-\infty, -7) \cup (-4, 6) \cup (6, \infty)$
(above x-axis)
 > 0

c) negative: $(-7, -4)$
(below x-axis)
 < 0

Solve the Polynomial Inequality

Factoring
by group

$$(x^3 - 4x^2)(-x + 4) \leq 0$$

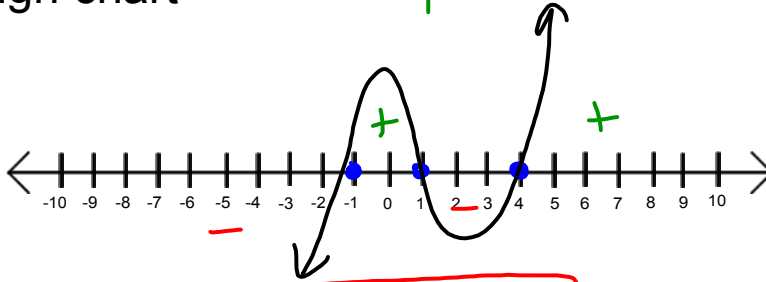
$$x^2(x-4) - 1(x-4)$$

$$(x-4)(x^2-1) = (x-4)(x+1)(x-1)$$

$$x = 4, -1, 1$$

Deg: 3 L.C. +
EB: ↓↑

Sign chart



$$(-\infty, -1] \cup [1, 4]$$

Solve the Polynomial Inequality

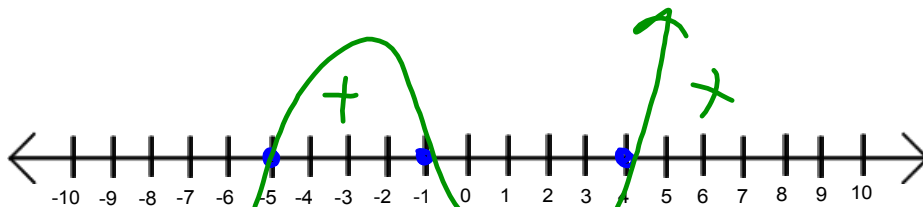
Use your graphing calculator!

$$x^3 + 2x^2 - 19x - 20 > 0$$

$$x = -5, -1, 4$$

EB: ↓↑

↑ Above
w/ round
parenthesis



$$(-5, -1) \cup (4, \infty)$$

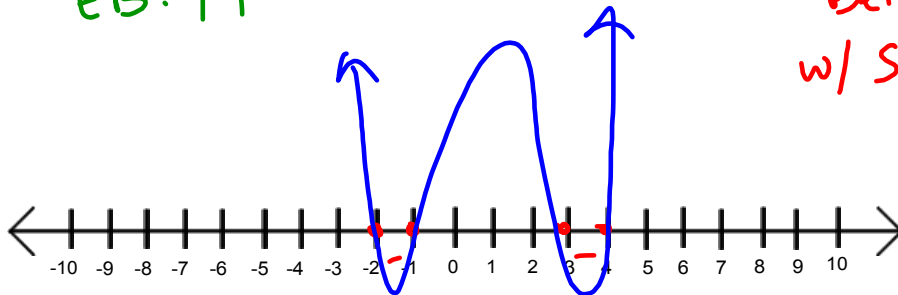
Solve the Polynomial Inequality

$$x^4 - 4x^3 - 7x^2 + 22x + 24 \leq 0$$

$$x = -2, -1, 3, 4$$

EB: ↑↑

↑
Below
w/ Square



$$[-2, -1] \cup [3, 4]$$

Check for understanding:

1. Find where the polynomial is zero, positive, or negative
 $x =$
 > 0 < 0

$$f(x) = (x + 3)(x + 1)^2(x - 4)^2$$

