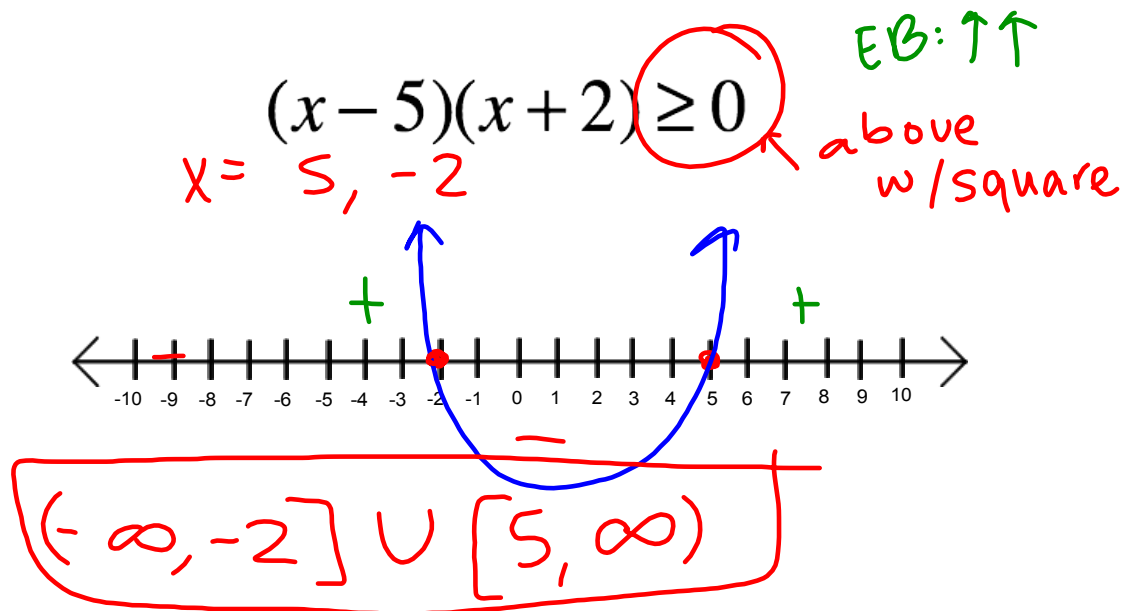


3-4 Solving Inequalities

Objective: Students can solve polynomial inequalities.

Recall from last year.

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



Solving Inequalities for Polynomials

1. Find Boundary Points

2. Find Solution Intervals

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

Key concepts

End behavior

Even: $\overset{+}{\uparrow\uparrow}$ $\overset{-}{\downarrow\downarrow}$ Same

Odd: $\downarrow\uparrow$ $\uparrow\downarrow$ Opposite

Multiplicity (degree of FACTORS)

Even : Tangent

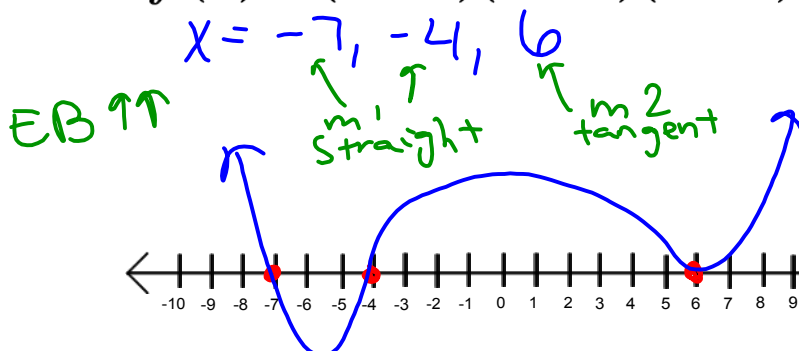
Odd : Inflection
through 1 : Straight

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

$x =$ > 0 < 0

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

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



a) zeros: $x = -7, -4, 6$

b) positive: $(-\infty, -7) \cup (-4, 6) \cup (6, \infty)$

c) negative: $(-7, -4)$

Solve the Polynomial Inequality

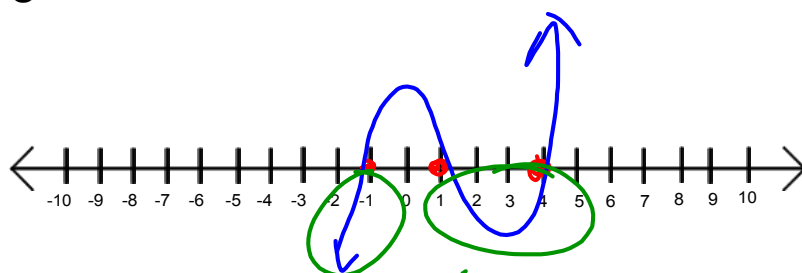
$$(x^3 - 4x^2)(x + 4) \leq 0$$

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

$x = 4, 1, -1$

Below w/ square

Sign chart



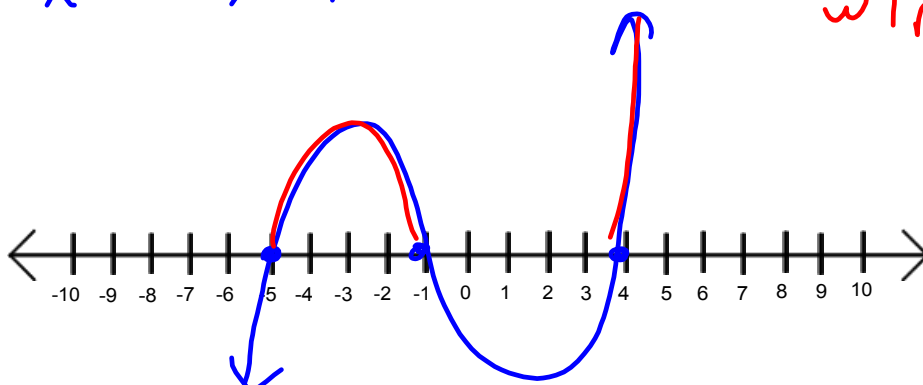
$$(-\infty, -1] \cup [1, 4]$$

Solve the Polynomial Inequality

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

$x = -5, -1, 4$

Above w/ round

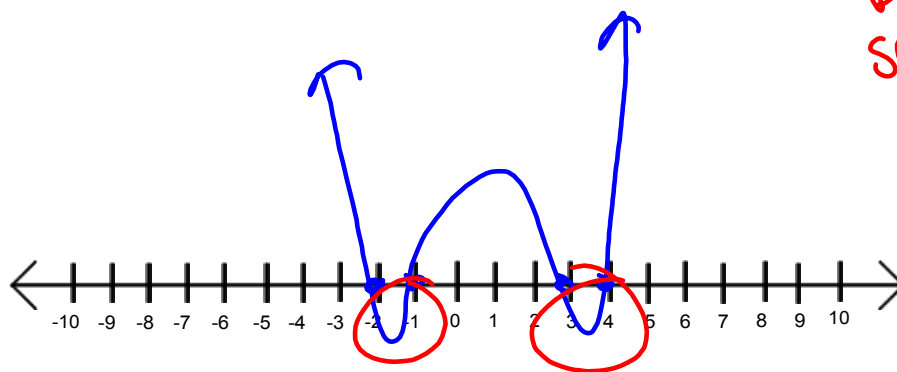


$$(-5, -1) \cup (4, \infty)$$

Solve the Polynomial Inequality

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

Below Square



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

Check for understanding:

1. Find where the polynomial is zero, positive, or negative

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

