


Chapter 2: Polynomial, Power, and Rational Functions

2.8: Solving Inequalities in One Variable

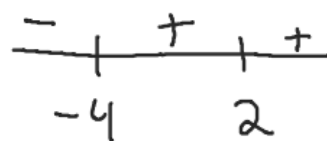
<p>$f(-4) = (-4+3)(-4-1)(-4-4)$ $(-1)(-5)(-8)$</p> 	<p>Determine the x-values that cause the polynomial function to be a) zero, b) positive, and c) negative</p> <p>a) $f(x) = (x+3)(x-1)(x-4)$ zeros $x = -3, 1, 4$</p> <p>b) $(-3, 1) \cup (4, \infty)$</p> <p>c) $(-\infty, -3) \cup (1, 4)$</p> <p>$x^2+3=0$ $x^2=-3$</p> <p>b) $f(x) = (x^2+3)(x+1)(x-2)$ a) zeros $x = -1, 2$</p> <p>b) Pos $(-\infty, -1) \cup (2, \infty)$</p> <p>c) Neg $(-1, 2)$</p> <p>c) $f(x) = (x+3)^3(x^2+1)(x-4)^2$ a) zeros $x = -3, 4$</p> <p>b) $(-3, 4) \cup (4, \infty)$</p> <p>c) $(-\infty, -3)$</p>
	<p>$f(0) = (3)(-1)(-4)$</p> <p>$f(2) = (2+3)(2-1)(2-4)$ $(5)(1)(-2)$</p> <p>$f(5) = (5+3)(5-1)(5-4)$ $(8)(4)(1)$</p> <p>$f(-2) = ((-2)^2+3)(-2+1)(-2-2)$ $(+)(-1)(-4)$</p> <p>$f(0) = (0^2+3)(0+1)(0-2)$ $(+)(+)(-)$</p> <p>$f(-4) = (-4+3)^3((-4)^2+1)(-4-4)^2$ $(-)(+)(+)$</p> <p>$f(0) = (0+3)^3(0^2+1)(0-4)^2$ $(+)(+)(+)$</p> <p>$f(5) = (5+3)^3(5^2+1)(5-4)^2$ $(+)(+)(+)$</p>

Solve the polynomial inequality using a sign chart.

a) $(x-2)^2(x+4) > 0$

Zeros $x=2, -4$

$(-4, 2) \cup (2, \infty)$



$f(-5) = (-5-2)^2(-5+4)$
 + (-)

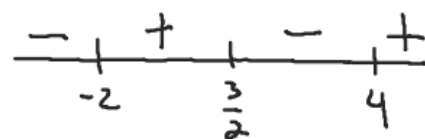
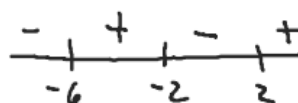
$f(0) = (0-2)^2(0+4)$
 + +

b) $(x+2)(x^2+4x-12) \leq 0$

$(x+6)(x-2)$

$(-\infty, -6] \cup [-2, 2]$

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



c) $2x^3 - 7x^2 - 10x + 24 < 0$

$(x+2)(2x-3)(x-4)$

$f(-3) = (-3+2)(2(-3)-3)(-3-4)$
 - - -

$f(0) = (0+2)(2(0)-3)(0-4)$
 + - -

$f(2) = (2+2)(2(2)-3)(2-4)$
 + + -

$f(5) = (5+2)(2(5)-3)(5-4)$

$(-\infty, -2) \cup (\frac{3}{2}, 4)$

$-2 \mid \begin{array}{cccc} 2 & -7 & -10 & 24 \\ & -4 & 22 & -24 \\ \hline 2 & -11 & 12 & 0 \end{array}$

$2x^2 - 11x + 12 = 0$

$(2x-3)(x-4)$

$x = \frac{3}{2} \quad x = 4$