

Section 2.8: Solving Rational Inequalities

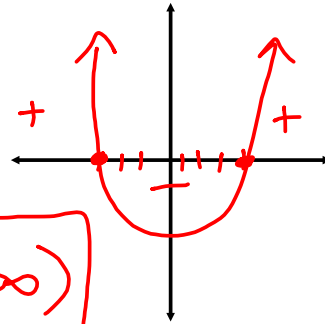
Solving an Inequality:

$$\bullet x^2 - x - 12 \geq 0$$

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

$$x = 4, x = -3$$

$$(-\infty, -3] \cup [4, \infty)$$

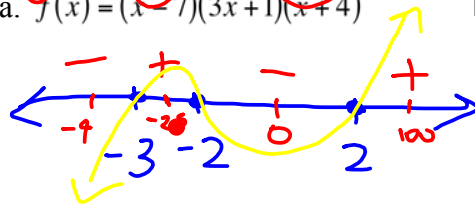


Sign-Chart:

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

Ex. 1 Make a sign chart for the following equations:

a. $f(x) = (x - 7)(3x + 1)(x + 4)$



b. $f(x) = (x + 3)(x - 2)(x + 2)$

-4	-	-	-	=	-
-2.5	+	-	-	=	+
0	+	-	+	=	-
100	+	+	+	=	+

Solving Polynomial Inequalities:

Ex. 2 Solve the following inequalities:

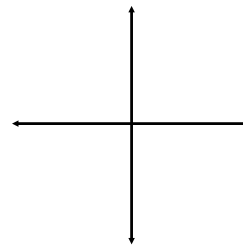
a. $-(x^2 + 3)(x - 5)^2 < 0$

b. $(x - 3)(x + 4)^2(x - 1)^3 \geq 0$

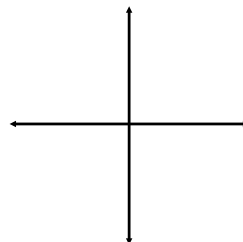
c. $2x^3 - 7x^2 - 10x + 24 > 0$

Ex. 3 Solve the following inequalities graphically:

a. $x^3 - 6x^2 \leq 2 - 8x$

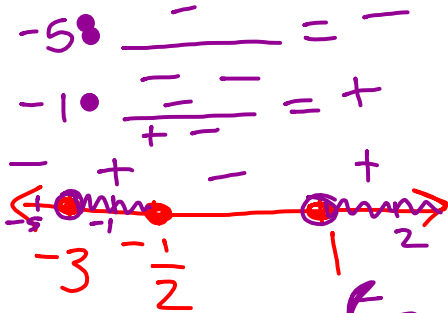


b. $2x^3 - 3x^2 - 5x + 5 < 0$



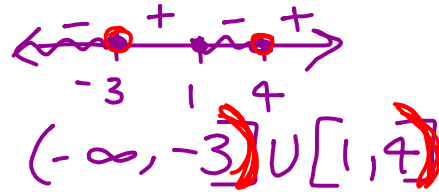
Ex. 3 Solve the following rational inequalities:

a. $\frac{2x+1}{(x+3)(x-1)} \geq 0$



$(-3, -\frac{1}{2}] \cup [1, \infty)$

b. $\frac{x-1}{(x+3)(x-4)} \leq 0$



$(-\infty, -3) \cup [1, 4)$

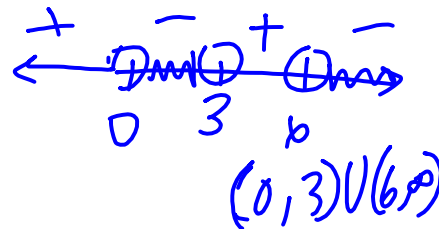
c. $\frac{x-2}{x} < \frac{x-4}{x-6}$

$\frac{-x-4}{x-6} - \frac{x-4}{x-6}$

$\frac{(x-2)(x-6) - x(x-4)}{x(x-6)} < 0$

$\frac{x^2 - 8x + 12 - x^2 + 4x}{x(x-6)} < 0$

$\frac{-4x + 12}{x(x-6)} < 0$



e. $\frac{\sqrt{x-3}}{(2x+1)(x-4)} < 0$

$(0, 3) \cup (6, \infty)$