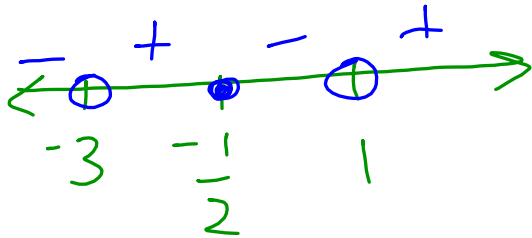


10-3 Solving Rational Inequalities

Making a Sign Chart for a Rational Function

$$\cancel{f(x)} = \frac{(2x+1)}{(x+3)(x-1)} \geq 0 \quad * \text{ points of interest}$$



Zeros	excluded values
num=0	den=0
• 0	o
≤ <	
≥ >	

$$f(-4) = \frac{-}{-} = -$$

$$f(-2) = \frac{-}{+} = +$$

$$f(0) = \frac{+}{+-} = -$$

$$f(100) = \frac{+}{++} = +$$

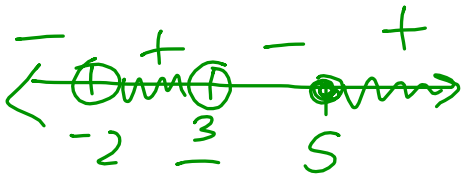
Rational Inequalities

goal: to find where the graph is (+) or (-) depending on the inequality sign (remember to flip sign if multiply or divide by (-))

1. Get everything on one side and zero on the other
2. Find LCD
3. Simplify the "everything" side into 1 fraction (not clearing fractions)
4. Find x-intercepts - plot with open or closed holes depending on inequality signs
5. Find excluded values (VA) - plot with open holes on line or cross off undefined interval
6. Make a sign chart by testing points in each interval
7. Write answer in interval notation

Solve the rational inequalities

A) $\frac{x-5}{(2x-3)(x+2)} \geq 0$



$(-2, 3/2) \cup [5, \infty)$

$f(-3) = \frac{-}{-} = -$

$f(0) = \frac{-}{+} = +$

$f(2) = \frac{-}{-} = +$

$f(6) = \frac{+}{+} = +$

c) $\frac{7-2x}{x+3} \leq -2$

$\frac{7-2x}{x+3} + 2 \leq 0$

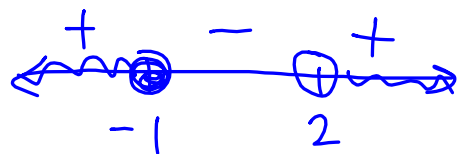
$(-\infty, -3)$

B) $\frac{2x-1}{x-2} \geq 1$

$\frac{2x-1}{x-2} - 1 \geq 0$

$\frac{2x-1-x+2}{x-2} \geq 0$

$\frac{x+1}{x-2} \geq 0$



$(-\infty, -1] \cup (2, \infty)$

Solve the rational inequalities

Never multiply both sides of an inequality by a variable!

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

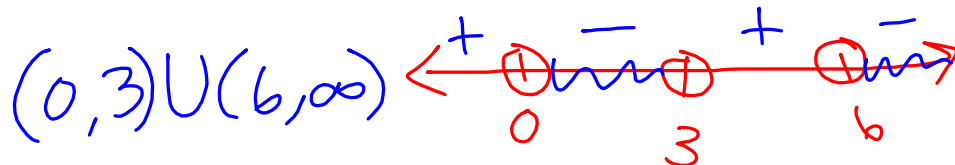
$$\frac{(x-2)(x-6)}{x(x-6)} < \frac{(x-4) \cdot x}{x-6 \cdot x} < 0$$

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

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

$$\frac{-4(x-3)}{x(x-6)} < 0$$

$$E) \frac{1}{x+2} > \frac{3}{x+1}$$



$$f(-1) = \frac{-}{-} = +$$

$$f(1) = \frac{-}{+} = -$$

$$f(4) = \frac{-}{+} = +$$

$$f(7) = \frac{+}{-} = -$$