Warm-up!

Unit 1 Day 10 (1.8): Rational Inequalities

Homework: Rational Inequalities

Quiz Next Class

Solve the following inequalities:

1) $2x^2 - 15 \geq x$

2) Combine $\frac{2}{x} - \frac{1}{x-3}$ using a common denominator.

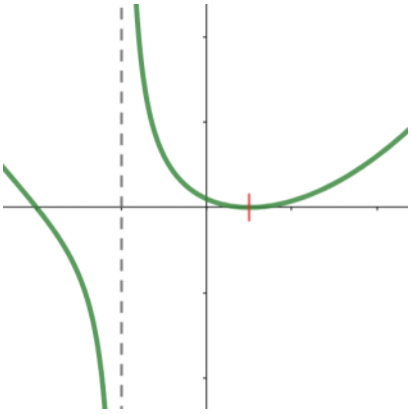
3) At what x-value(s) is the expression from #2 equal to zero?

4) At what x-value(s) is the expression from #2 undefined?

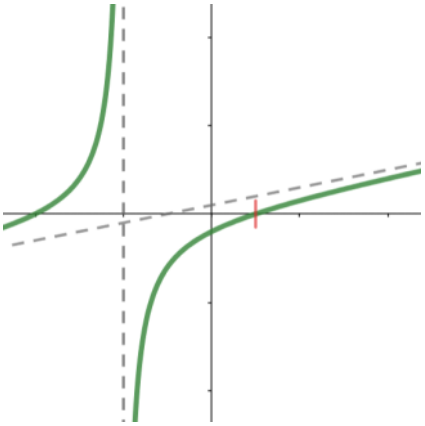
A closer look at bouncing vs crossing rules

Predict what will happen at $x = 1$

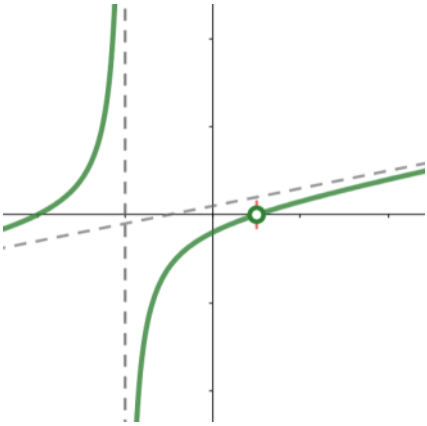
$$y = \frac{(x+4)(x-1)^2}{(x+2)}$$



$$y = \frac{(x+4)(x-1)}{(x+2)}$$



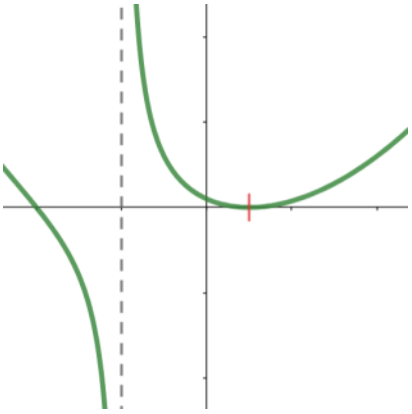
$$y = \frac{(x+4)(x-1)^2}{(x+2)(x-1)}$$



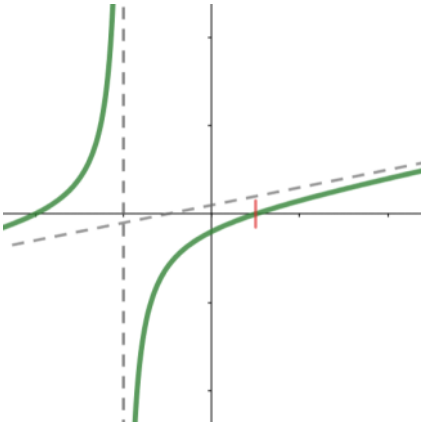
A closer look at bouncing vs crossing rules

Predict what will happen at $x = 1$

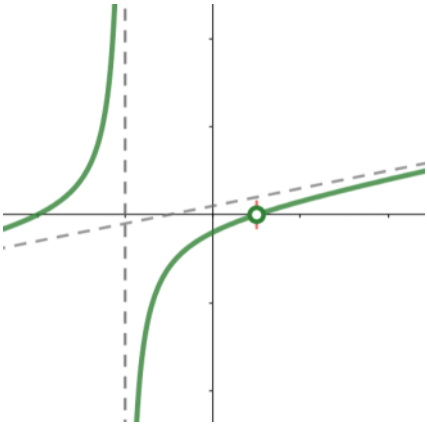
$$y = \frac{(x+4)(x-1)^2}{(x+2)}$$



$$y = \frac{(x+4)(x-1)}{(x+2)}$$



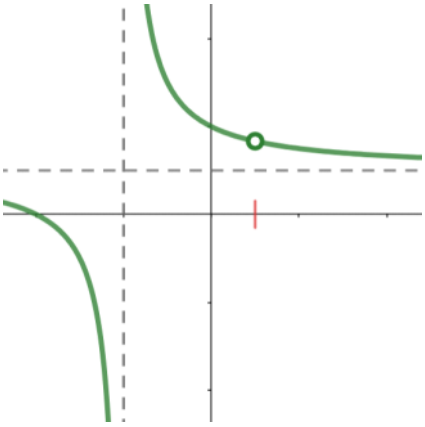
$$y = \frac{(x+4)(x-1)^2}{(x+2)(x-1)}$$



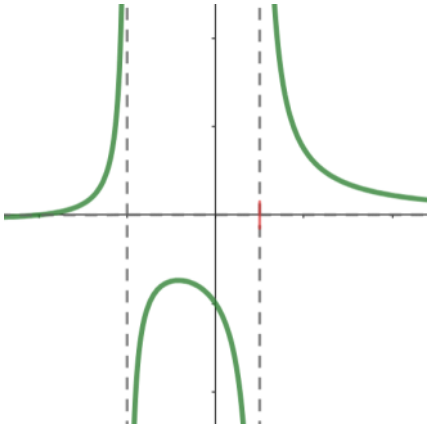
A closer look at bouncing vs crossing rules

Predict what will happen at $x = 1$

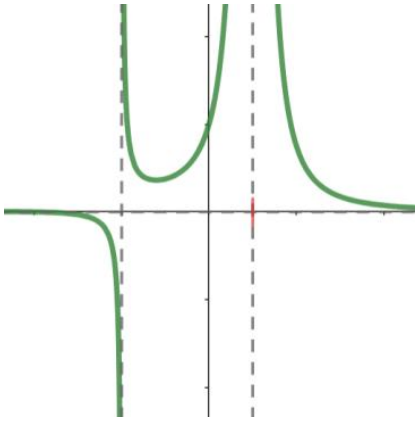
$$y = \frac{(x+4)(x-1)}{(x+2)(x-1)}$$



$$y = \frac{(x+4)}{(x+2)(x-1)}$$



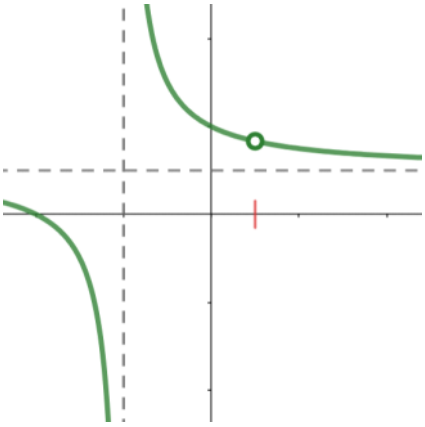
$$y = \frac{(x+4)}{(x+2)(x-1)^2}$$



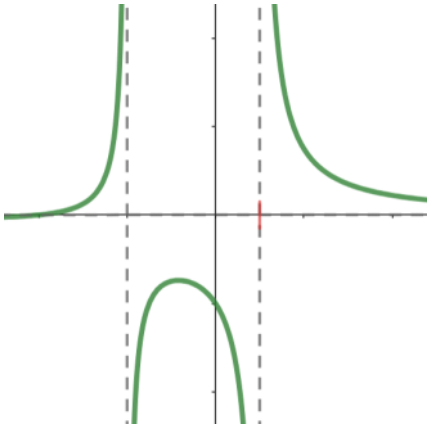
A closer look at bouncing vs crossing rules

Predict what will happen at $x = 1$

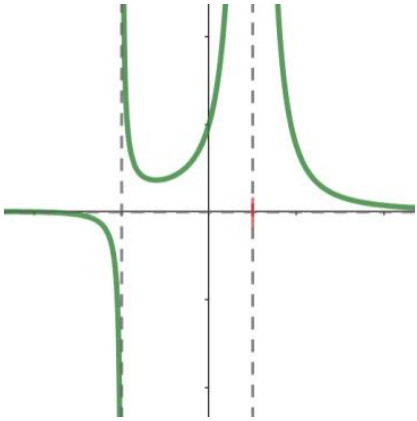
$$y = \frac{(x+4)(x-1)}{(x+2)(x-1)}$$



$$y = \frac{(x+4)}{(x+2)(x-1)}$$



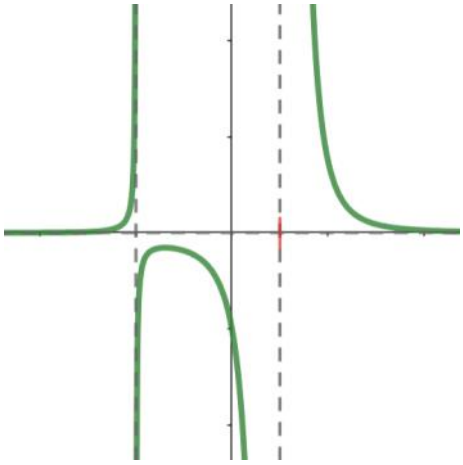
$$y = \frac{(x+4)}{(x+2)(x-1)^2}$$



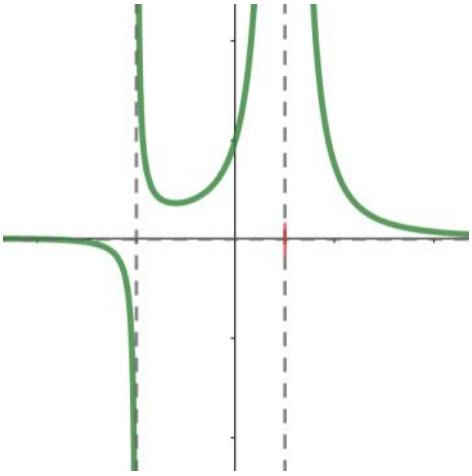
A closer look at bouncing vs crossing rules

Predict what will happen at $x = 1$

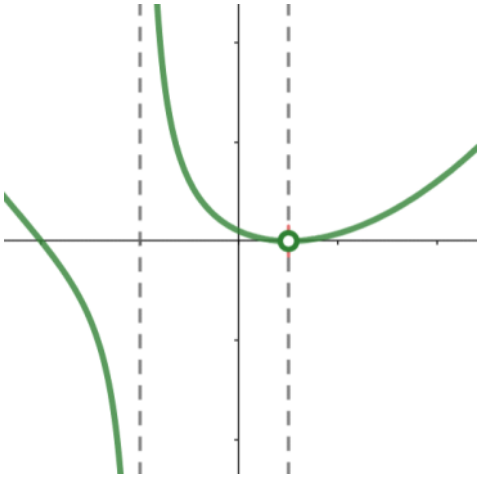
$$y = \frac{(x+4)}{(x+2)(x-1)^3}$$



$$y = \frac{(x+4)(x-1)}{(x+2)(x-1)^3}$$



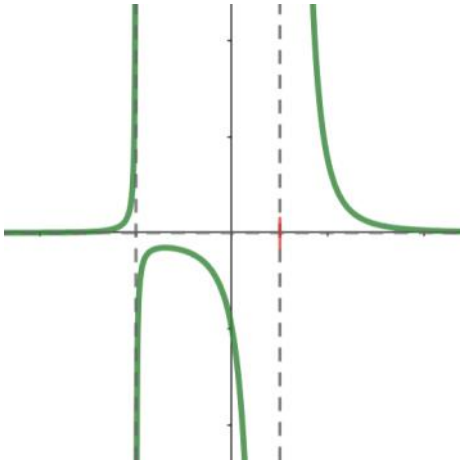
$$y = \frac{(x+4)(x-1)^3}{(x+2)(x-1)}$$



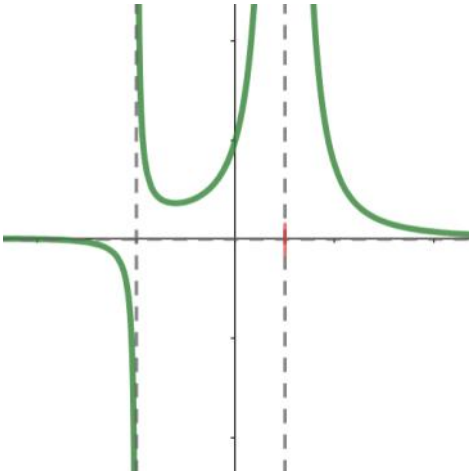
A closer look at bouncing vs crossing rules

Predict what will happen at $x = 1$

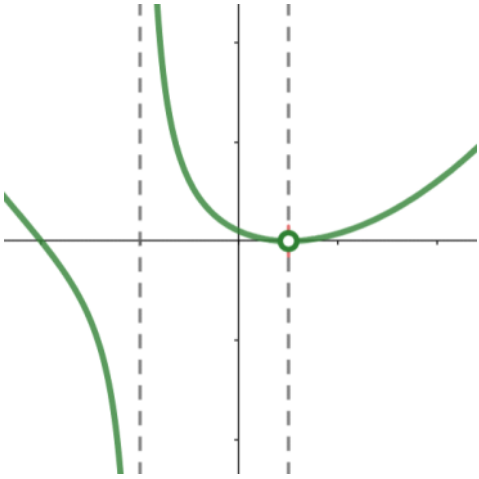
$$y = \frac{(x+4)}{(x+2)(x-1)^3}$$



$$y = \frac{(x+4)(x-1)}{(x+2)(x-1)^3}$$



$$y = \frac{(x+4)(x-1)^3}{(x+2)(x-1)}$$



To Solve Rational Inequalities

1. Move everything to one side, combine into a single rational expression
2. Put zeros of numerator and zeros of denominator on number line
3. Test regions/Apply understanding of bouncing + crossing + rational end behavior
4. Check answer

$$\frac{x^2 - 6x + 9}{x^2 + 2x - 24} > 0$$

Solving By Testing Regions

Solving By Graphing

Example 1

$$\frac{(x+2)(x-5)}{(x-3)(x+4)} \leq 0$$

Solving By Testing Regions

Solving By Graphing

Example 2

$$\frac{x^2 - 3x - 10}{x^2 - x - 6} < 0$$

Solving By Testing Regions

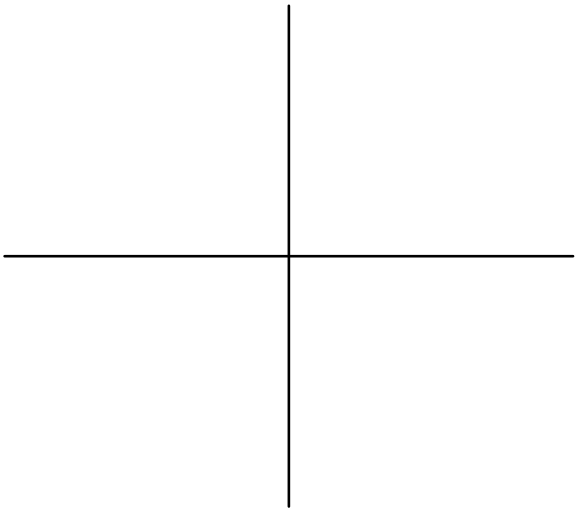
Solving By Graphing

Example 3

$$\frac{(x-6)^2(x+4)(x-1)^3}{(x+2)^2(x-5)} < 0$$

Solving By Testing Regions

Solving By Graphing

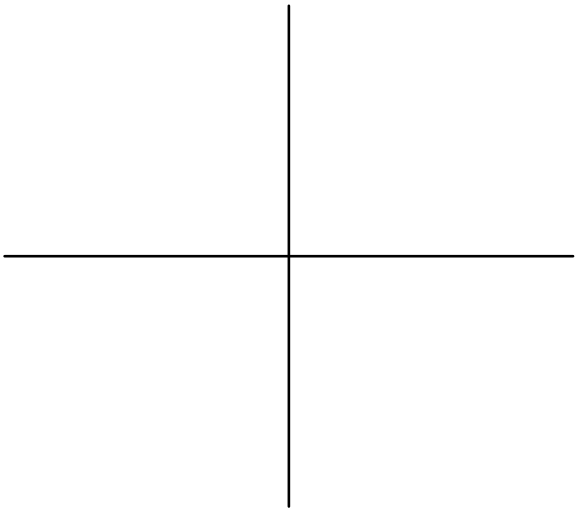


Example 4

$$\frac{2x^3 - 5x^2}{4x^2 - 20x + 25} \geq 0$$

Solving By Testing Regions

Solving By Graphing



Example 5 (from the warm-up)

$$\frac{2}{x} < \frac{1}{x-3}$$

Solving By Testing Regions

Solving By Graphing