

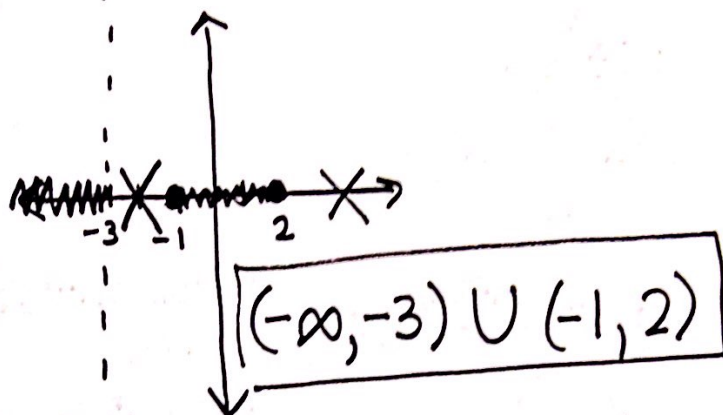
Rational Inequalities Notes

Solve and write in interval notation.

$$1. \frac{x^2 - x - 2}{x + 3} < 0$$

$$\frac{(x-2)(x+1)}{x+3} < 0$$

(Top) Critical Points: 2, -1 (Bottom) Asymptote: -3



Test Points:

$$\frac{(-4-2)(-4+1)}{-4+3} < 0$$

$$\frac{-6(-3)}{-1} < 0$$

$$\frac{18}{-1} < 0$$

$$-18 < 0$$

$$\frac{(-2-2)(-2+1)}{-2+3} < 0$$

$$\frac{-4(-1)}{1} < 0$$

$$4 < 0$$

$$\frac{(0-2)(0+1)}{0+3} < 0$$

$$\frac{-2(1)}{3} < 0$$

$$-\frac{2}{3} < 0$$

$$\frac{(3-2)(3+1)}{3+3} < 0$$

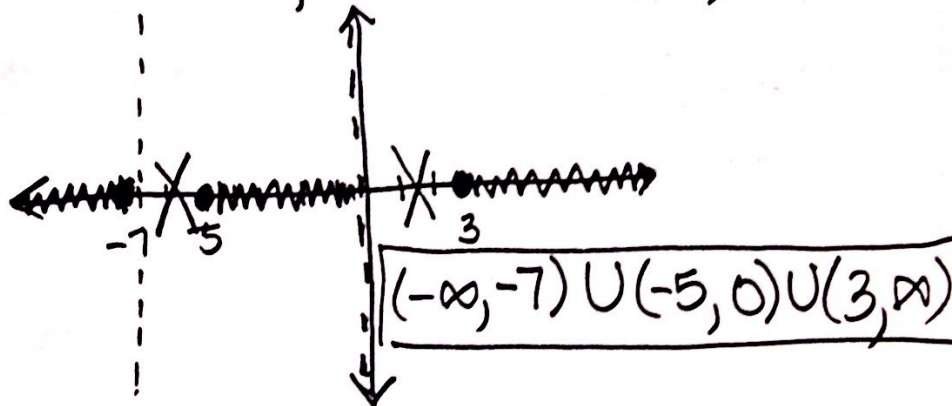
$$\frac{1(4)}{6} < 0$$

$$\frac{4}{6} < 0$$

$$2. \frac{x^2 + 2x - 15}{x^2 + 7x} > 0$$

$$\frac{(x+5)(x-3)}{x(x+7)} > 0$$

Critical Points: -5, 3 Asymptote: -7, 0



Test Points:

$$\frac{(-8+5)(-8-3)}{-8(-8+7)} > 0$$

$$\frac{-3(-11)}{-8(-1)} > 0$$

$$\frac{33}{8} > 0$$

$$\frac{(-6+5)(-6-3)}{-6(-6+7)} > 0$$

$$\frac{-1(-9)}{-6(1)} > 0$$

$$\frac{9}{-6} > 0$$

$$\frac{(-2+5)(-2-3)}{-2(-2+7)} > 0$$

$$\frac{3(-5)}{-2(5)} > 0$$

$$\frac{-15}{-10} > 0$$

$$\frac{15}{10} > 0$$

$$\frac{(2+5)(2-3)}{2(2+7)} > 0$$

$$\frac{7(-1)}{2(9)} > 0$$

$$\frac{-7}{18} > 0$$

$$\frac{(4+5)(4-3)}{4(4+7)} > 0$$

$$\frac{9(1)}{4(11)} > 0$$

$$\frac{9}{44} > 0$$

$$3. \frac{1}{x} - x \geq 0$$

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

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

$$\frac{(1+x)(1-x)}{x} \geq 0$$

Test Points:

$$\frac{(1-2)(1+2)}{-2} \geq 0$$

$$\frac{-1(3)}{-2} \geq 0$$

$$\frac{-3}{-2} \geq 0$$

$$\frac{3}{2} \geq 0$$

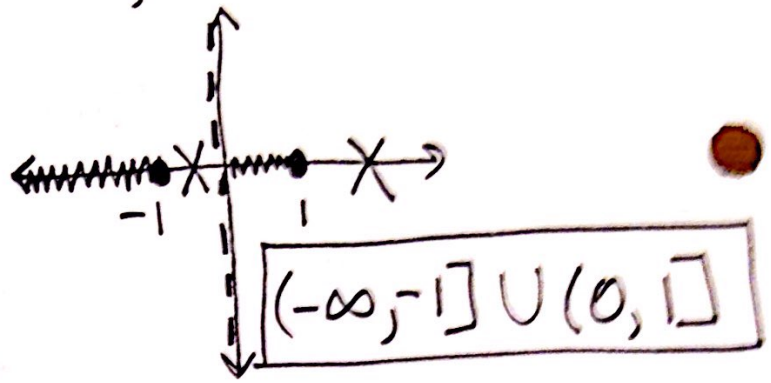
$$4. \frac{x+6}{x+1} - 2 < 0$$

$$\frac{x+6}{x+1} + \frac{-2x-2}{x+1} < 0$$

$$\frac{-x+4}{x+1} < 0$$

Critical Points: -1, 1

Asymptote: 0



$$\frac{(1-0.5)(1+0.5)}{-0.5} \geq 0$$

$$\frac{0.5(1.5)}{-0.5} \geq 0$$

$$\frac{0.75}{-0.5} \geq 0$$

$$-1.5 \geq 0$$

$$\frac{(1+0.5)(1-0.5)}{0.5} \geq 0$$

$$\frac{1.5(0.5)}{0.5} \geq 0$$

$$\frac{0.75}{0.5} \geq 0$$

$$1.5 \geq 0$$

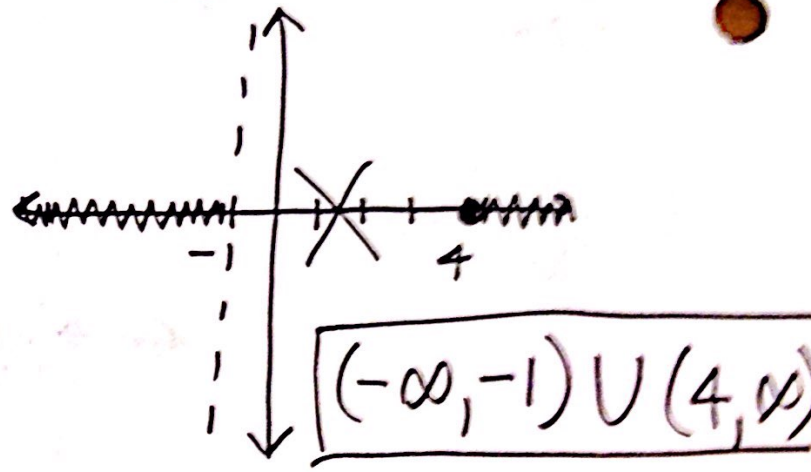
$$\frac{(1+2)(1-2)}{2} \geq 0$$

$$\frac{3(-1)}{2} \geq 0$$

$$-\frac{3}{2} \geq 0$$

Critical Points: 4

Asymptote: -1



Test Points:

$$\frac{-(-2)+4}{-2+1} < 0$$

$$\frac{6}{-1} < 0$$

$$-6 < 0$$

$$\frac{-1+4}{1+1} < 0$$

$$\frac{3}{2} < 0$$

$$\frac{-5+4}{5+1} < 0$$

$$-\frac{1}{6} < 0$$