

## Solving a Rational Inequality example:

1) Need this form  $\boxed{\frac{\text{Single fraction}}{\text{fraction}} > 0}$  or  $\boxed{\frac{\text{Single fraction}}{\text{fraction}} < 0}$

Example:  $\frac{4}{x+5} > \frac{1}{2x+3}$

$$\frac{4}{x+5} - \frac{1}{2x+3} > 0 \quad \text{LCD} = (x+5)(2x+3) \quad \frac{4(2x+3)}{(x+5)(2x+3)} - \frac{1(x+5)}{(x+5)(2x+3)} > 0$$

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

2) Set numerator and denominator = 0 (find critical numbers)

$$7x + 7 = 0 \quad (x + 5) = 0 \quad (2x + 3) = 0$$

$$x = -1 \quad x = -5 \quad x = \frac{-3}{2} \quad (\text{put these numbers on a number line})$$

$$\langle \text{-----} + \text{-----} + \text{-----} + \text{-----} + \text{-----} \rangle$$

$$\quad \quad \quad -5 \quad \quad \frac{-3}{2} \quad \quad -1$$

Test points: (use calculator here !)

$$(x = -6): \quad \frac{7(-6) + 7}{(-6 + 5)(2(-6) + 3)} = \frac{-}{+} = - \text{ negative (no solution)}$$

$$(x = -4): \quad \frac{7(-4) + 7}{(-4 + 5)(2(-4) + 3)} = \frac{-}{-} = + \text{ positive (yes solution)}$$

$$(x = -1.4): \quad \frac{7(-1.4) + 7}{(-1.4 + 5)(2(-1.4) + 3)} = \frac{-}{+} = - \text{ negative (no solution)}$$

$$(x = 0): \quad \frac{7(0) + 7}{(0 + 5)(2(0) + 3)} = \frac{-}{-} = + \text{ positive (yes solution)}$$

3) Answer:  $\boxed{(-5, \frac{-3}{2}) \cup (-1, \infty)}$