

Lesson 49 Objective: SWBAT solve quadratic inequalities.

Kickoff- Solve each of the following.

1)  $\frac{3p}{p-5} - \frac{2}{p+3} = \frac{p}{p+3}$     2)  $\frac{y}{y-2} = \frac{y}{y-1} + \frac{y}{y-1}$

$3p(p+3) - 2(p-5) = p(p-5)$   
 $3p^2 + 9p - 2p + 10 = p^2 - 5p$   
 $2p^2 + 12p + 10 = 0$   
 $2(p^2 + 6p + 5) = 0$   
 $2(p+1)(p+5) = 0$   
 $p = -1 \quad p = -5$

$y^2 = 8y - 1 + y$   
 $y^2 = 8y - 8 + y$   
 $y^2 = 9y - 8$   
 $y^2 - 9y + 8 = 0$   
 $(y-8)(y-1) = 0$   
 $y = 8 \quad y = 1$

11)  $\frac{1}{b+6}$

olve for b

$b(b+3) \geq -2$

$b^2 + 3b \geq -2$   
 $b^2 + 3b + 2 \geq 0$   
 $(b+2)(b+1) = 0$   
 $b = -2 \quad b = -1$

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

Rational Inequalities

- 1) Find when the fraction(s) are undefined, this is called the critical point. (undefined when the denominator is equal to zero)
- 2) Change the inequality sign to an equal sign.
- 3) Solve as you would a fractional equation.
- 4) Draw a number line, plot the critical points (always open circles) and the solutions on the inequality given the original problem.
- 5) Pick test points in each interval on the number line.
- 6) Check the test points in the original inequality to determine where to shade.

Examples: C.P.  $x = -5$

1)  $\frac{x-4}{x+5} < 4$

$\frac{x-4}{x+5} = 4(x+5)$

$x-4 = 4(x+5)$   
 $x-4 = 4x+20$   
 $-x-20 = x+20$   
 $-24 = 3x$   
 $-8 = x$

$(-\infty, -8) \cup (-5, \infty)$

2)  $2 - \frac{3}{x} > \frac{5}{x}$     C.P.  $x = 0$

$2a - 3 = 5$   
 $2a = 8$   
 $a = 4$

$(-\infty, 0) \cup (4, \infty)$

3)  $2 - \frac{x}{x+1} \geq 3 - \frac{9}{x+1}$     C.P.  $x = -1$

$2(x+1) - x = 3(x+1) - 9$   
 $2x+2-x = 3x+3-9$   
 $x+2 = 3x-6$   
 $8 = 2x$   
 $x = 4$

$(-1, 4]$

X	Y1	Y2
-2	0	12
0	2	-6
5	1.16	1.5

## Rational Inequalities

$$1) \frac{x+2}{x+3} < \frac{x-1}{x-2} \quad \text{C.P. } x = -3 \quad 2) 1 + \frac{2}{x+1} \leq \frac{2}{x}$$

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

$$(x-2)(x+2) = (x-1)(x+3)$$

$$x^2 - 4 = x^2 + 2x - 3$$

$$-4 = 2x - 3$$

$$+3 \quad +3$$

$$-1 = 2x$$

$$x = -\frac{1}{2}$$

$$3) \frac{3x-1}{x^2-x-6} \leq 1$$

$$4) \frac{x^2-9}{x^2-3x+2} < 0$$