

Questions from Homework?

6ac
11
12
16

$$6a) \frac{2x}{2x+1} = \frac{5}{4-x}$$

$$\frac{2x}{2x+1} - \frac{5}{4-x} = 0$$

$$\frac{2x(4-x) - 5(2x+1)}{(2x+1)(4-x)} = 0$$

$$\frac{8x - 2x^2 - 10x - 5}{(2x+1)(4-x)} = 0$$

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

$$-2x^2 - 2x - 5 = 0$$

$$2x^2 + 2x + 5 = 0$$

$$\sqrt{2^2 - 4(2)(5)}$$

~~$\sqrt{4-40}$~~ No real roots

$$c) \frac{2x}{5} = \frac{x^2 - 5x}{5x}$$

$$\frac{2x}{5} \left[\frac{x^2 - 5x}{5x} \right] = 0$$

$$\frac{2x^2 - [x^2 - 5x]}{5x} = 0$$

$$\Rightarrow \frac{x^2 + 5x}{5x} = 0$$

$$\frac{x(x+5)}{5x} = 0$$

$$\frac{x+5}{5} = 0$$

$$x+5=0$$

$$x=-5$$

Restriction
 $x \neq 0$

$$x^2 + 5x = 0$$

$$x(x+5) = 0$$

~~$x=0$~~ or $x=-5$
Not valid

$$11) \frac{330}{(x-15)} - \frac{300}{x} = \frac{1.50}{1} \quad \begin{array}{l} x \neq 0 \\ x \neq 15 \end{array}$$

$$\frac{330x - 300(x-15) - 1.5(x)(x-15)}{x(x-15)} = 0$$

$$330x - 300x + 4500 - 1.5x^2 + 22.5x = 0$$

$$-1.5x^2 + 52.5x + 4500 = 0$$

$$-1.5(x^2 - 35x - 3000) = 0$$

$$-1.5(x - 75)(x + 40) = 0$$

$$x = 75 \text{ or } -40$$

$\therefore 75$ comics

$$12b) C(t) = 9 - 90000 \left(\frac{1}{10000 + 3t} \right)$$

as $t \rightarrow \infty$

$$\frac{1}{10000 + 3t} \rightarrow 0$$

$$C(t) \rightarrow 9$$

Lesson 5.05 - Solving Rational Inequalities



Learning Goals:

- I can solve any rational inequality graphically or algebraically

$$\frac{3x+1}{x+4} - 1 \geq 0$$

$$\frac{3x+1}{x+4} - \frac{x+4}{x+4} \geq 0$$

$$\frac{3x+1-(x+4)}{x+4} \geq 0$$

$$\frac{2x-3}{x+4} \geq 0$$

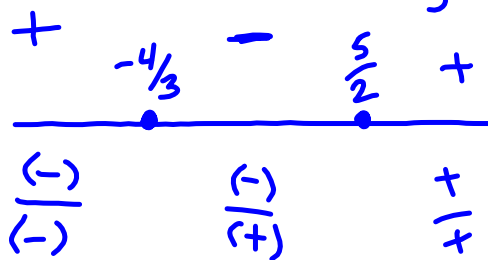
Example

Solve each of the following inequalities.

$$\frac{2x-5}{3x+4} < 0$$

$2x-5=0$
 $x = \frac{5}{2}$

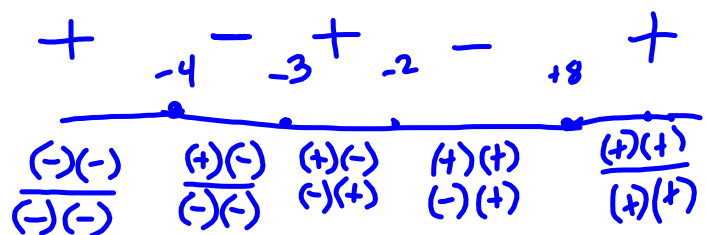
$3x+4=0$
 $x = -\frac{4}{3}$



$$\therefore -\frac{4}{3} < x < \frac{5}{2}$$

$$\frac{x^2 + 6x + 8}{x^2 - 5x - 24} \geq 0$$

$$\frac{(x+4)(x+2)}{(x-8)(x+3)} \geq 0$$



$$x \leq -4 \quad -3 \leq x \leq -2$$

$$x \geq 8$$

$$(-\infty, -4] \cup [-3, -2] \cup [8, \infty)$$

Example

Solve each of the following inequalities.

$$x - 2 < \frac{8}{x}$$

$$x - 2 - \frac{8}{x} < 0$$

$$\frac{x^2 - 2x - 8}{x} < 0$$

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

$$\begin{array}{ccccccc} - & & + & & - & & + \\ & & \cdot & & \cdot & & \cdot \\ \hline & & -2 & & 0 & & -4 & & + \\ & & \cdot & & \cdot & & \cdot & & \cdot \\ \hline (-)(-) & & (-)(+) & & (-)(+) & & (+)(+) & & \\ (-) & & (-) & & (+) & & (+) & & \end{array}$$

$$x < -2 \quad 0 < x < 4$$

$$\frac{7}{x-3} \geq \frac{2}{x+4}$$

$$\frac{7(x+4) - 2(x-3)}{(x-3)(x+4)} \geq 0$$

$$\frac{7x + 28 - 2x + 6}{(x-3)(x+4)} \geq 0$$

$$\frac{5x + 34}{(x-3)(x+4)} \geq 0$$

$$\begin{array}{ccccccc} - & & -34 & & + & & - & & + \\ & & \cdot & & \cdot & & \cdot & & \cdot \\ \hline & & -\frac{34}{5} & & -4 & & +3 & & + \\ & & \cdot & & \cdot & & \cdot & & \cdot \\ \hline (-) & & (+) & & (+) & & (+) & & \\ (-)(-) & & (-)(-) & & (-)(+) & & (+)(+) & & \end{array}$$

$$-\frac{34}{5} \leq x \leq -4 \quad \text{or} \quad x \geq 3$$

Homework:

pg 295 #1¹, 4bf², 9³, 11⁴

Challenge: 13, 15

Corrections

1: 1a is wrong

2: no verification is needed

3: change $t > 0$ to $t \geq 0$

(answer: $[0, 0.31]$)

4: final answer is $1 < x < 5$

