

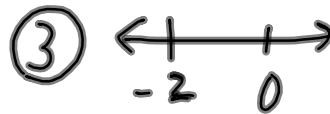
9-6 day 2

Cross off #42  
Add #10

Today, we are going to solve Rational Inequalities.  
Follow these steps:

- 1) State the excluded values
- 2) Solve the related equation (just like yesterday)
- 3) Use the values from #1 and #2 to divide the number line into regions. Test a value in each region to see what works.

Ex 1)  $\frac{1}{4a} + \frac{5a}{8a} > \frac{1}{2}$



$a \mid a < -2 \text{ or } a > 0$

①  $4a \neq 0$   
 $a \neq 0$

②  $\left[ \frac{1}{4a} + \frac{5a}{8a} = \frac{1}{2} \right] \frac{8a}{1}$   
 $2 + 5a = 4a$   
 $2 + a = 0$   
 $a = -2$

Test  $a = -3$   
 $\frac{1}{4(-3)} + \frac{5(-3)}{8(-3)} > \frac{1}{2}$   
 $-\frac{1}{12} + \frac{5}{8} > \frac{1}{2}$   
 $54/16 > 1/2$   
Yes

Test  $a = -1$   
 $\frac{1}{4(-1)} + \frac{5(-1)}{8(-1)} > \frac{1}{2}$   
 $-\frac{1}{4} + \frac{5}{8} > \frac{1}{2}$   
 $\frac{3}{8} > \frac{1}{2}$   
No

Test  $a = 1$   
 $\frac{1}{4 \cdot 1} + \frac{5 \cdot 1}{8 \cdot 1} > \frac{1}{2}$   
 $\frac{1}{4} + \frac{5}{8} > \frac{1}{2}$   
 $\frac{7}{8} > \frac{1}{2}$   
Yes

Ex 2)  $\frac{1}{3s} + \frac{2}{9s} < \frac{2}{3}$

$a = -2$

①  $s \neq 0$

②  $\left[ \frac{1}{3s} + \frac{2}{9s} = \frac{2}{3} \right] \frac{9s}{1}$

$3 + 2 = 6s$   
 $5 = 6s$   
 $s = \frac{5}{6}$



$s \mid s < 0 \text{ or } s > \frac{5}{6}$

Test  $a = -1$   
 $\frac{1}{3(-1)} + \frac{2}{9(-1)} < \frac{2}{3}$   
 $-\frac{1}{3} + \frac{-2}{9} < \frac{2}{3}$   
Yes

Test  $a = \frac{1}{3}$   
 $\frac{1}{3 \cdot \frac{1}{3}} + \frac{2}{9 \cdot \frac{1}{3}} < \frac{2}{3}$   
 $1 + \frac{2}{3} < \frac{2}{3}$   
No

Test  $a = 1$   
 $\frac{1}{3(1)} + \frac{2}{9(1)} < \frac{2}{3}$   
 $\frac{1}{3} + \frac{2}{9} < \frac{2}{3}$   
 $\frac{5}{9} < \frac{6}{9}$   
Yes

**Work Problem**

Ex 3) Scott and Tony mow lawns. Tony does the job alone in 4.5 hours while Scott does the job alone in 3.7 hours. How long does it take for them to mow the lawn if they work together to complete the job?

$$\begin{array}{l} \text{Scott's} + \text{Tony's} = \text{Job Done} \\ \text{WORK} \quad \text{WORK} \quad \text{100\%} \end{array}$$

$$\left[ \frac{1}{3.7} \cdot t + \frac{1}{4.5} \cdot t = 1 \right] \frac{(3.7)(4.5)}{1}$$

$$4.5t + 3.7t = (3.7)(4.5)$$

$$8.2t = 16.65$$

$$t = \text{2.030 hrs}$$

$t = \text{time}$



Rate  $\times$  Time = Work Complete

"Rate x Time = Distance"

Ex 4) Jaime swam for 5 hours in a stream with a current of 1 mph. She leaves her dock and swims upstream for 2 miles and then back to her dock. What is her swim speed in still water?

$$R \cdot T = D$$

$$T = \frac{D}{R}$$

$r$  = Swim speed in still water  
 $r + 1$  = w/ current  
 $r - 1$  = against current



Time w/ current + Time against current = Total Time

$$\frac{(r+1)(r-1)}{1} \left[ \frac{2}{r+1} + \frac{2}{r-1} = 5 \right]$$

$$2(r-1) + 2(r+1) = 5(r-1)(r+1)$$

$$2r - 2 + 2r + 2 = 5(r^2 - 1)$$

$$4r = 5r^2 - 5$$

$$0 = 5r^2 - 4r - 5$$

$$r = \frac{4 \pm \sqrt{16 - 4(5)(-5)}}{2(5)} = \frac{4 \pm \sqrt{116}}{10} \rightarrow -$$

1.47

1.5 mph