

Rational and Radical Inequalities



Mar 1-8:00 AM

What are we going to do?

~ Solve Rational Inequalities using a graphing calculator and algebraically

~ Solve Radical Inequalities using a graphing calculator and algebraically

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Technology Works Wonders

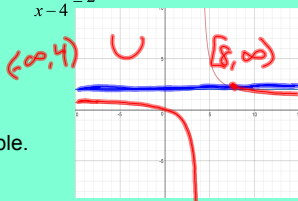
**Rational Inequality:** an inequality that contains one or more rational expressions

$$\frac{x}{x-4} \leq 2$$

Y1:  $\frac{x}{x-4}$

Y2: 2

Use your table.



**Radical Inequality:** an inequality that contains a variable within a radical

$$\sqrt{2x+4} \leq 4$$

Y1:  $\sqrt{2x+4}$

Y2: 4



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Solve the following using your graphing calculator:

a)  $\frac{x}{x-3} \geq 4$

b)  $\frac{8}{x+1} < -2$

c)  $\sqrt{x-3} + 2 \leq 5$

d)  $\sqrt[3]{x+2} \geq 1$

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Solving Rational Inequalities Algebraically

1) Solve for the zeros of the function.  
 $\frac{x^2+x-12}{x-1} \leq 0$   
 $x^2+x-12=0$   
 $(x-3)(x+4)=0$   
 $x=3, x=-4$

2) Solve for where the inequality is undefined.  
 $x-1=0$   
 $x=1$

3) Create a sign analysis chart.  

$\frac{+}{-}$	$\frac{-}{+}$	$\frac{+}{-}$	$\frac{-}{+}$
$\frac{+}{0}$	$\frac{-}{0}$	$\frac{+}{0}$	$\frac{-}{0}$

 $(-\infty, 1) \cup [3, \infty)$

\*This is the same process as the example above but make it a comparison to 0.\*

$\frac{3}{x-2} \leq -1$   
 $\frac{3}{x-2} + 1 \leq 0$   
 $\frac{3}{x-2} + \frac{x-2}{x-2} \leq 0$   
 $\frac{3+x-2}{x-2} \leq 0$   
 $\frac{x+1}{x-2} \leq 0$

Find zeros  
 $x+1=0$   
 $x=-1$

Undefined  
 $x-2=0$   
 $x=2$

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