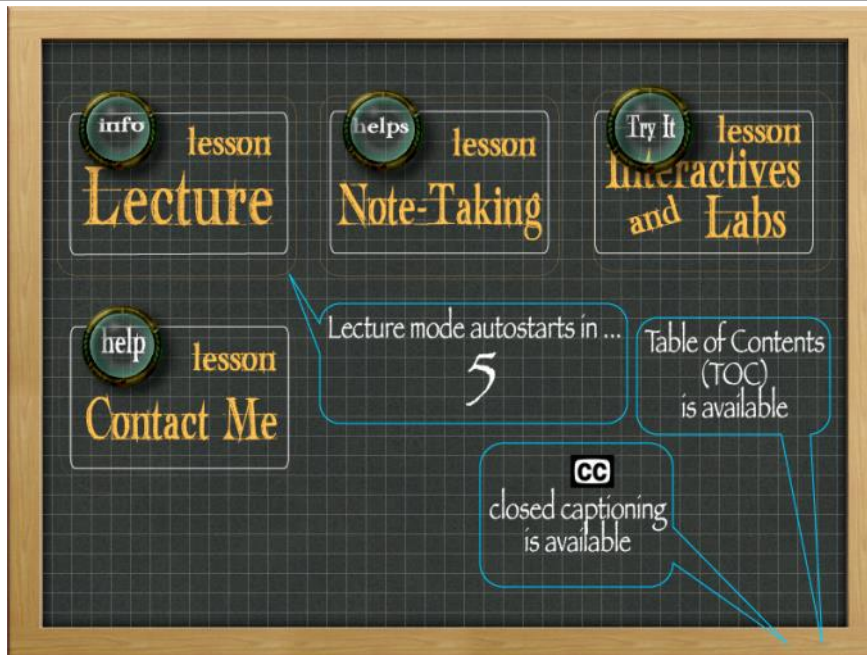


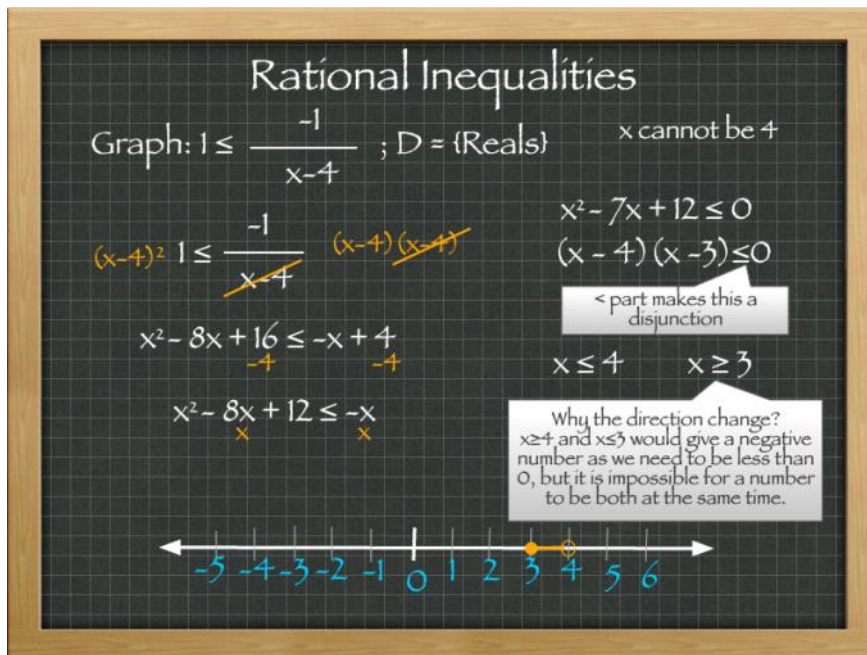
Rational Inequalities

Monday, January 23, 2012
2:19 PM

Slide



Notes



First, let's note that our domain has a limitation in that the x cannot be a 4 because then there would be a 0 in the denominator. That would be undefined.

When the variable is in the denominator we have to take some special steps when we have an inequality because if the $x-4$ is negative we would have to switch the 'less than or equal to' direction but we don't if it is positive. How do we know what the variable is going to be if it is an unknown? We don't. So, we have a different procedure with inequalities than we do with equalities when the variable is in the denominator. We will multiply it by the square of what is in the denominator. Since the variable will always end up a positive number in the initial steps we solve our dilemma.

So, let's raise both sides to $x-4$ squared. We will cancel and solve for x so that we can get everything to one side.

Now we factor. We get x is less than or equal to 4 as one of the possibilities, but remember that we are not allowed to have 4 because that would make the denominator a zero. It is a limitation of our domain. So we will place a hollow circle at 4. The other x can be equal to or greater than 3. When we graph it, we get this

graph.

$$\frac{m-2}{m+2} \leq 2; D = \{\text{Reals}\}$$
$$(m+2) \frac{m-2}{m+2} \leq 2(m+2)(m+2)$$
$$\begin{array}{r} m^2 - 4 \\ -m^2 \end{array} \leq \begin{array}{r} 2m^2 + 8m + 8 \\ -m^2 \end{array}$$
$$\begin{array}{r} -4 \\ + \end{array} \leq \begin{array}{r} m^2 + 8m + 8 \\ + \end{array}$$
$$m^2 + 8m + 12 \geq 0$$
$$(m+2) \quad (m+6)$$

2 or -2 6 or -6

> part makes this a disjunction

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You have completed
this topic

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