

## 5.5 Solving Rational Inequalities

<p><b>A Rational Inequalities</b></p> <p>In order to solve a rational (nonlinear) inequality:</p> <ol style="list-style-type: none"> <li>1. state <i>restrictions</i></li> <li>2. <i>move</i> all the terms to one side</li> <li>3. find the <i>LCD</i> (Least Common Denominator) and simplify the rational expression</li> <li>4. <i>factor</i> both the numerator and the denominator</li> <li>5. find the <i>sign</i> of the rational expression by using a <i>sign chart</i>, <i>graph</i> or <i>critical numbers</i> method</li> <li>6. <i>conclude</i> and verify if <i>restrictions</i> are satisfied</li> </ol>	<p>Ex 1. Is possible to use cross multiplication to solve the following inequality? Explain. Solve it by using four different methods.</p> $\frac{1}{x} \leq \frac{2}{x+1}$
<p>Ex 2. Solve the following inequalities:</p> <p>a) <math>\frac{x+1}{x-1} \geq 0</math></p> <p>b) <math>\frac{x^2-1}{x-2} \leq 0</math></p> <p>c) <math>\frac{x^2+1}{x^2-4} &gt; 0</math></p> <p>d) <math>\frac{x^3+1}{x^3-1} &lt; 0</math></p>	<p>Ex 3. Solve the following inequalities:</p> <p>a) <math>\frac{1}{x-1} &gt; \frac{1}{x+1}</math></p> <p>b) <math>4x - \frac{5}{x-1} \geq 2x-1</math></p> <p>c) <math>\frac{4x+5}{x^2} \geq \frac{4}{x+5}</math></p> <p>d) <math>\frac{x}{2x-4} - \frac{3}{x-6} \leq \frac{1}{2}</math></p>

Ex 4. Solve the following inequality:

$$\frac{x}{x-2} + \frac{1}{x-4} \geq \frac{2}{x^2 - 6x + 8}$$

Ex 5. Solve the following inequality:

$$\frac{5}{x} \leq \frac{6}{x-1} < \frac{x}{x-2}$$

Ex 6. Solve the following inequality:

$$\frac{1}{|x-1|} - \frac{|x+1|}{x} \leq 2$$

**Reading:** Nelson Textbook, Pages 288-295

**Homework:** Nelson Textbook, Page 295: #4ab, 5acf, 7, 12, 13