

Connecting Graphs & Rational Equations

Rational equations can be solved algebraically or graphically. Solving rational equations algebraically will sometimes result in extraneous solutions, so be sure to check for these.

Example 1: Solve a Rational Equation Algebraically & Graphically

- a. Solve $\frac{3}{x} = 1 + \frac{x-13}{6}$ *algebraically*. b. Verify your solution(s) *graphically*.

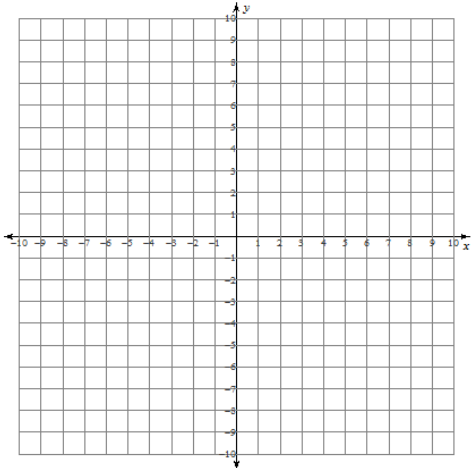
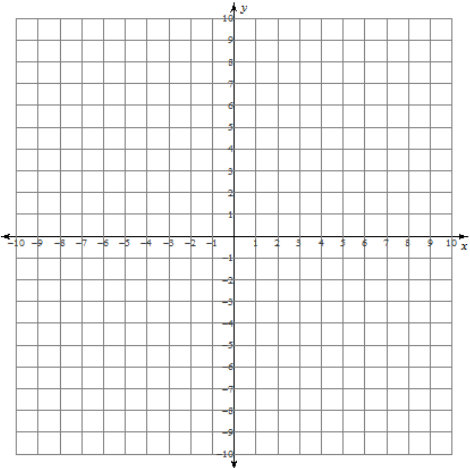
Solution:

- a. Solve $\frac{3}{x} = 1 + \frac{x-13}{6}$ algebraically. Restrictions: _____

LCD: _____

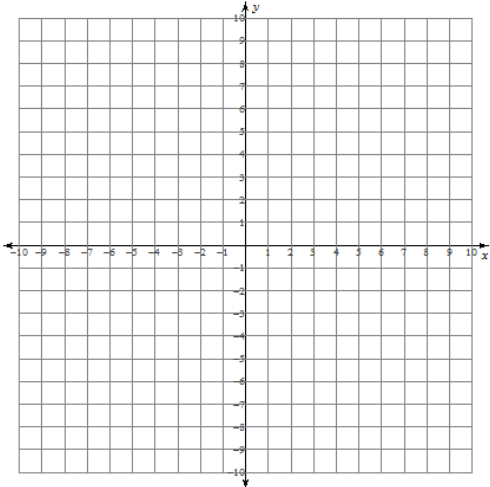
Solve:

- b. Verify graphically:

Method 1	Method 2
<p>Rearrange the equation so that one side is equal to 0 and graph the corresponding single function. The solution(s) will be the x-intercept(s).</p> <p>y = _____</p>  <p>Solution(s): _____</p>	<p>Graph a system of two functions. The solution(s) will be the x-coordinate(s) of any point(s) of intersection.</p> <p>y₁ = _____</p> <p>y₂ = _____</p>  <p>Solution(s): _____</p>

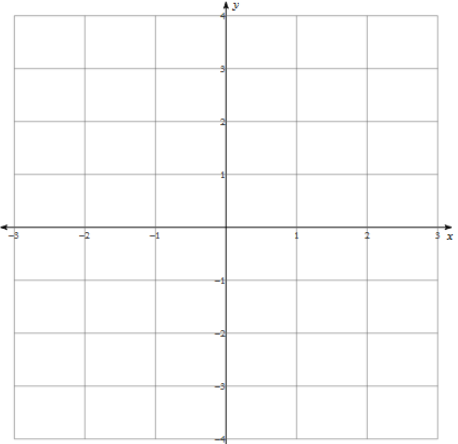
Example 2: Determine Approximate Solutions for Rational Equations

Solve the equation $2 - \frac{3x}{2} = \frac{1 + 4x - x^2}{4x + 10}$ graphically and algebraically. Express your answer(s) to the nearest hundredth.

Graphically	Algebraically
<p>$y =$ _____ (Use method 1)</p>  <p>Solution(s): _____</p>	<p>Restrictions: _____</p> <p>LCD: _____</p> <p>Solve:</p>

Example 3: Solve a Rational Equation with an Extraneous Root

Solve $\frac{x}{x-1} - 2x = \frac{x+1}{2x-2}$ graphically and algebraically.

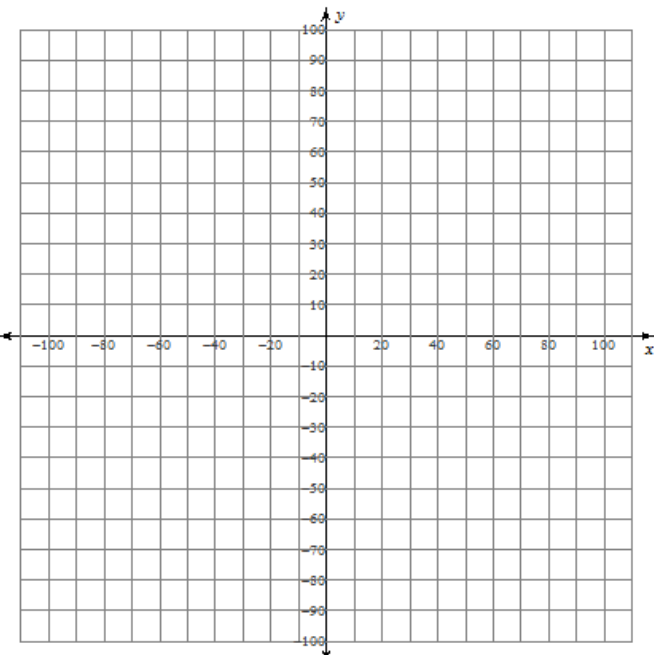
Graphically	Algebraically
<p>$y_1 =$ _____ (Use method 2)</p> <p>$y_2 =$ _____</p>  <p>Solution(s): _____</p>	<p>Restrictions: _____</p> <p>LCD: _____</p> <p>Solve:</p>

Example 4: Solve a Problem Using a Rational Equation

Robbie and Melissa are traveling separately from their home in Fredericton to a wedding 400 km away. Robbie leaves 1 hour earlier than Melissa, but Melissa drives at an average speed 20 km/h faster than Robbie. If they arrive at the wedding at the exact same time, what was the average speed at which each of them traveled?

Let $x =$ _____

Equation: _____

Graphically	Algebraically
<p>$y =$ _____</p>  <p>Solutions: _____</p>	

The solutions to the rational equation are $x =$ _____ and $x =$ _____, however, $x =$ _____ is _____ in this situation, so $x =$ _____.

Robbie traveled at an average speed of _____ and Melissa traveled at an average speed of _____.