



# Graphing Calculator Investigation

A Follow-Up of Lesson 9-6

TI-82

## Solving Rational Equations by Graphing

You can use a graphing calculator to solve rational equations. You need to graph both sides of the equation and locate the point(s) of intersection. You can also use a graphing calculator to confirm solutions that you have found algebraically.

### Example

Use a graphing calculator to solve  $\frac{4}{x+1} = \frac{3}{2}$ .

- First, rewrite as two functions,  $y_1 = \frac{4}{x+1}$  and  $y_2 = \frac{3}{2}$ .
- Next, graph the two functions on your calculator.

**KEYSTROKES:**  $\boxed{Y=}$  4  $\boxed{\div}$   $\boxed{(}$   $\boxed{X,T,\theta}$   $\boxed{+}$  1  $\boxed{)}$   $\boxed{\nabla}$  3  
 $\boxed{\div}$  2  $\boxed{\text{ZOOM}}$  6

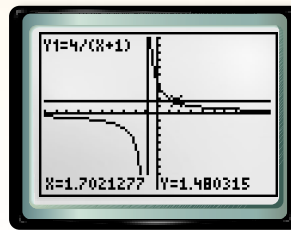
Notice that because the calculator is in connected mode, a vertical line is shown connecting the two branches of the hyperbola. This line is not part of the graph.

- Next, locate the point(s) of intersection.

**KEYSTROKES:**  $\boxed{2\text{nd}}$   $\boxed{\text{CALC}}$  5

Select one graph and press  $\boxed{\text{ENTER}}$ . Select the other graph, press

$\boxed{\text{ENTER}}$ , and press  $\boxed{\text{ENTER}}$  again. The solution is  $1\frac{2}{3}$ . Check this solution by substitution.



$[-10, 10]$  scl: 1 by  $[-10, 10]$  scl: 1

### Exercises

Use a graphing calculator to solve each equation.

1.  $\frac{1}{x} + \frac{1}{2} = \frac{2}{x}$  **2**

2.  $\frac{1}{x-4} = \frac{2}{x-2}$  **6**

3.  $\frac{4}{x} = \frac{6}{x^2}$  **1.5**

4.  $\frac{1}{1-x} = 1 - \frac{x}{x-1}$   
**all real numbers except 1**

5.  $\frac{1}{x+4} = \frac{2}{x^2+3x-4} - \frac{1}{1-x}$   
**no real solution**

6.  $\frac{1}{x-1} + \frac{1}{x+2} = \frac{1}{2}$  **-1, 4**

Solve each equation algebraically. Then, confirm your solution(s) using a graphing calculator.

7.  $\frac{3}{x} + \frac{7}{x} = 9$  **1 $\frac{1}{9}$**

11.  $\frac{-3 \pm \sqrt{17}}{2}$  or about **-3.56 and 0.56**

8.  $\frac{1}{x-1} + \frac{2}{x} = 0$   **$\frac{2}{3}$**

9.  $1 + \frac{5}{x-1} = \frac{7}{6}$  **31**

10.  $\frac{1}{x^2-1} = \frac{2}{x^2+x-2}$  **0**

11.  $\frac{6}{x^2+2x} - \frac{x+1}{x+2} = \frac{2}{x}$

12.  $\frac{3}{x^2+5x+6} + \frac{x-1}{x+2} = \frac{7}{x+3}$  **7**



[www.algebra2.com/other\\_calculator\\_keystrokes](http://www.algebra2.com/other_calculator_keystrokes)