Graphing Calculator Lab

Casio FX-9750G

Solving Rational Equations and Inequalities with Graphs and Tables

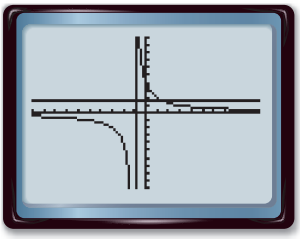
You can use a **Casio FX-9750G** graphing calculator to solve rational equations by graphing or by using the table feature. Graph both sides of the equation and locate the point(s) of intersection.

ACTIVITY 1 Solve $\frac{4}{x+1} = \frac{3}{2}$.

Step 1 **Graph each side of the equation.**

Graph each side of the equation as a separate function. Enter $\frac{4}{x+1}$ as Y1 and $\frac{3}{2}$ as Y2. Then graph the two equations.

KEYSTROKES: 4 ÷ (X,θ,T + 1) EXE 3 ÷ 2 EXE F6



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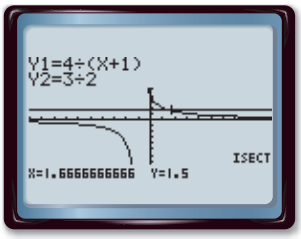
Because the calculator is in connected mode, a vertical line may appear connecting the two branches of the graph. This is not part of the graph.

Step 2 **Use the intersect feature.**

The intersect feature on the G-Solv menu allows you to approximate the ordered pair of the point at which the graphs cross.

KEYSTROKES: SHIFT F5 F5



The solution is $1\frac{2}{3}$.

Step 3 **Use the table feature.**

Verify the solution using the table feature. Set up the table to show x-values in increments of $\frac{1}{3}$.

KEYSTROKES: MENU 7 F5 0 EXE 2 EXE 1 ÷ 3 EXE EXIT F6

The table displays x-values and corresponding y-values for each graph. At $x = 1\frac{2}{3}$, both functions have a y-value of 1.5. Thus, the solution of the equation is $1\frac{2}{3}$.

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You can use a similar procedure to solve rational inequalities using a graphing calculator.

ACTIVITY 2 **Solve $\frac{3}{x} + \frac{7}{x} > 9$.**

Step 1 **Enter the inequalities.**

Rewrite the problem as a system of inequalities.

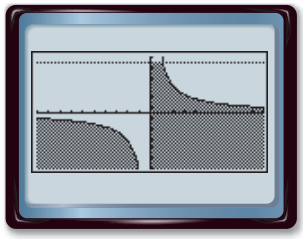
The first inequality is $\frac{3}{x} + \frac{7}{x} > y$ or $y < \frac{3}{x} + \frac{7}{x}$.

The second inequality is $y > 9$.

KEYSTROKES: F3 F6 F2 3 ÷ X,θ,T + 7 ÷ X,θ,T EXE F3 F6 F1 9 EXE

Step 2 **Graph the system.**

KEYSTROKES: F6



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The solution set of the original inequality is the set of x-values of the points in the region where the shadings overlap. Using the calculator's intersect feature, you can conclude that the solution set is $\left\{x \middle| 0 > x > 1\frac{1}{9}\right\}$.

EXERCISES

Solve each equation or inequality.

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

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

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

4. $\frac{1}{1-x} = 1 - \frac{x}{x-1}$

5. $\frac{1}{x+4} = \frac{2}{x^2+3x-4} - \frac{1}{1-x}$

6. $\frac{1}{x} + \frac{1}{2x} > 5$

7. $\frac{1}{x-1} + \frac{2}{x} < 0$

8. $1 + \frac{5}{x-1} \leq 0$

9. $2 + \frac{1}{x-1} \geq 0$