



Graphing Calculator

A Follow-Up of Lesson 5-8

Casio CFX-9850GB Plus

Solving Radical Equations and Inequalities by Graphing

You can use a Casio CFX-9850GB Plus to solve radical equations and inequalities. One way to do this is by rewriting the equation or inequality so that one side is 0 and then using the zero feature on the calculator.

Solve $\sqrt{x} + \sqrt{x+2} = 3$.

Step 1 Rewrite the equation.

- Subtract 3 from each side of the equation to obtain $\sqrt{x} + \sqrt{x+2} - 3 = 0$.
- Enter the function $y = \sqrt{x} + \sqrt{x+2} - 3$ in the Y= list of the TABLE menu.

KEYSTROKES: Review entering a function on page 128.

Step 2 Use a table.

- You can use the TABLE function to locate intervals where the solution(s) lie. First, enter the starting value and the interval for the table.

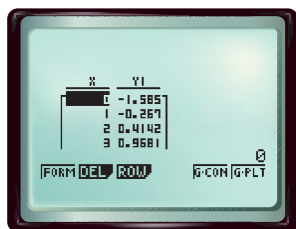
KEYSTROKES: $\boxed{\text{F5}}$ $\boxed{0}$ $\boxed{\text{EXE}}$ $\boxed{5}$ $\boxed{\text{EXE}}$ $\boxed{1}$ $\boxed{\text{EXE}}$
 $\boxed{\text{EXIT}}$



Step 3 Estimate the solution.

- Complete the table and estimate the solution(s).

KEYSTROKES: $\boxed{\text{F6}}$

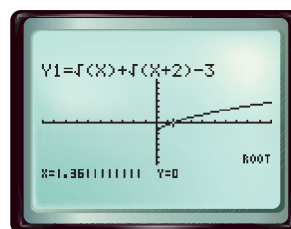


Since the function changes sign from negative to positive between $x = 1$ and $x = 2$, there is a solution between 1 and 2.

Step 4 Use the Root feature.

- Graph, then select Root from the G-SLV feature.

KEYSTROKES: $\boxed{\text{MENU}}$ $\boxed{5}$ $\boxed{\text{F6}}$ $\boxed{\text{SHIFT}}$ $\boxed{\text{F5}}$
 $\boxed{\text{F1}}$



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

The solution is about 1.36. This agrees with the estimate made by using the TABLE.



www.algebra2.com/other_calculator_keystrokes

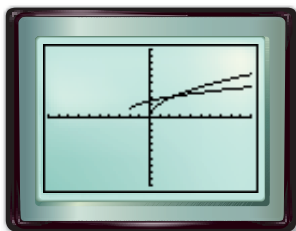
Investigation

Instead of rewriting an equation or inequality so that one side is 0, you can also treat each side of the equation or inequality as a separate function and graph both.

Solve $2\sqrt{x} > \sqrt{x+2} + 1$.

Step 1 Graph each side of the inequality.

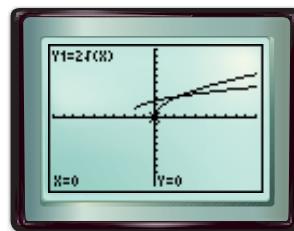
- In the $Y=$ list, enter $y_1 = 2\sqrt{x}$ and $y_2 = \sqrt{x+2} + 1$. Then press **F6**.



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

Step 2 Use the trace feature.

- Press **SHIFT** **F1**. You can use **▲** or **▼** to switch the cursor between the two curves.



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

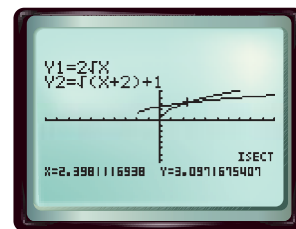
The calculator screen above shows that, for points to the left of where the curves cross, $Y_1 < Y_2$ or $2\sqrt{x} < \sqrt{x+2} + 1$. To solve the original inequality, you must find points for which $Y_1 > Y_2$. These are the points to the right of where the curves cross.

Step 3 Use the intersect feature.

- You can use the INTERSECT feature to approximate the x -coordinate of the point at which the curves cross.

KEYSTROKES: **EXIT** **F6** **SHIFT** **F5** **F5**.

The calculator screen shows that the x -coordinate of the point at which the curves cross is about 2.40. Therefore, the solution of the inequality is about $x > 2.40$. Use the symbol $>$ instead of \geq in the solution because the symbol in the original inequality is $>$.



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

Exercises 4. about 3.89 5. about 2.52 8. about $0 \leq x < 1$ 9. about $1 \leq x < 4.52$

Solve each equation or inequality.

- $\sqrt{x+4} = 3$ **5**
- $\sqrt{3x-5} = 1$ **2**
- $\sqrt{x+5} = \sqrt{3x+4}$ **0.5**
- $\sqrt{x+3} + \sqrt{x-2} = 4$
- $\sqrt{3x-7} = \sqrt{2x-2} - 1$
- $\sqrt{x+8} - 1 = \sqrt{x+2}$ **4.25**
- $\sqrt{x-3} \geq 2$ **$x \geq 7$**
- $\sqrt{x+3} > 2\sqrt{x}$
- $\sqrt{x} + \sqrt{x-1} < 4$

- Explain how you could apply the technique in the first example to solving an inequality. **See margin.**