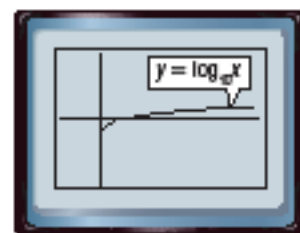


Solving Logarithmic Equations and Inequalities

You have solved logarithmic equations algebraically. You can also solve logarithmic equations by graphing or by using a table. The Casio CFX 9750 G has $y = \log_{10} x$ as a built-in function. Enter **MENU** 5 **LOG** **X** **EXE** **FB** to view this graph. To graph logarithmic functions with bases other than 10, you must use the Change

of Base Formula, $\log_a n = \frac{\log_b n}{\log_b a}$.



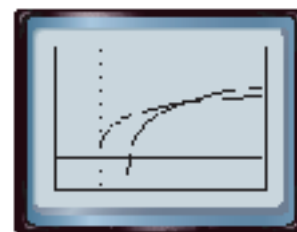
[-2, 8] scl: 1 by [-5, 5] scl: 1

ACTIVITY 1 Solve $\log_2(6x - 8) = \log_3(20x + 1)$.

Step 1 Graph each side of the equation.

Graph each side of the equation as a separate function. Enter $\log_2(6x - 8)$ as Y1 and $\log_3(20x + 1)$ as Y2. Then graph the two equations.

KEYSTROKES: **LOG** **(** 6 **X,T** **-** 8 **)** **÷** **LOG** 2
EXE **LOG** **(** 20 **X,T** **+** 1 **)** **÷** **LOG** 3 **EXE** **FB**

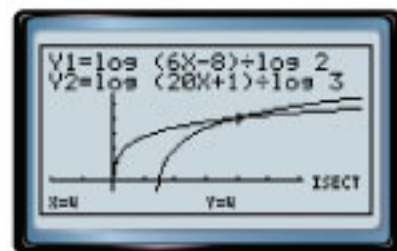


[-2, 8] scl: 1 by [-2, 8] scl: 1

Step 2 Use the intersect feature.

Use the intersect feature on the G-SOLV menu to approximate the ordered pair of the point at which the curves cross.

KEYSTROKES: See Solving Systems of Equations by Graphing to review how to use the intersect feature.



The calculator screen shows that the x-coordinate of the point at which the curves cross is 4. Therefore, the solution of the equation is 4.

Step 3 Use the table feature.

KEYSTROKES: See Solving Exponential Equations and Inequalities

Examine the table to find the x-value for which the y-values for the graphs are equal. At $x = 4$, both functions have a y-value of 4. Thus, the solution of the equation is 4.



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

