



Graphing Calculator Investigation

A Follow-Up of Lesson 9-3

Casio Algebra FX 2.0

Graphing Rational Functions

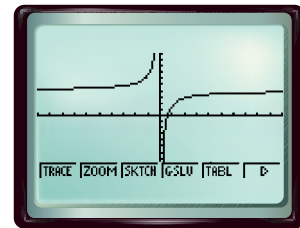
A Casio Algebra FX 2.0 graphing calculator can be used to explore the graphs of rational functions. These graphs have some features that never appear in the graphs of polynomial functions.

Example 1 Graph $y = \frac{8x - 5}{2x}$ in the standard viewing window. Find the equations of any asymptotes.

- Enter the equation in the Y= list.

KEYSTROKES: MENU 3 (8 X,θ,T - 5) ÷ (2 X,θ,T) EXE F5

By looking at the equation, we can determine that if $x = 0$, the function is undefined. The equation of the vertical asymptote is $x = 0$. Notice what happens to the y values as x grows larger and as x gets smaller. The y values approach 4. So, the equation for the horizontal asymptote is $y = 4$.



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

Example 2 Graph $y = \frac{x^2 - 16}{x + 4}$ in the window $[-5, 5]$ by $[-10, 2]$ with scale factors of 1.

- The graph looks like a solid line, however it is not continuous. Use the TABLE feature to find the y values for x values -5 through 5.

KEYSTROKES: ESC F6 F2 -5 EXE 5 EXE 1 EXE EXE F5

Notice the error at $x = -4$. This happens because the denominator is 0 when $x = -4$. Therefore, the function is undefined when $x = -4$.



Exercises 1–6. See pp. 519A–519D for graphs.

Use a graphing calculator to graph each function. Be sure to show a complete graph. Draw the graph on a sheet of paper. Write the x -coordinates of any points of discontinuity and/or the equations of any asymptotes.

- $f(x) = \frac{1}{x}$ $x = 0, y = 0$
- $f(x) = \frac{x}{x + 2}$
- $f(x) = \frac{2}{x - 4}$ $x = 4, y = 0$
- $f(x) = \frac{2x}{3x - 6}$
- $f(x) = \frac{4x + 2}{x - 1}$
- $f(x) = \frac{x^2 - 9}{x + 3}$ **point discontinuity at $x = -3$**
- Which graph(s) has point discontinuity? **6**
- Describe functions that have point discontinuity. **See margin.**

www.algebra2.com/other_calculator_keystrokes