

8.2 Graph Rational Functions

QUESTION How can you use a graphing calculator to graph rational functions?

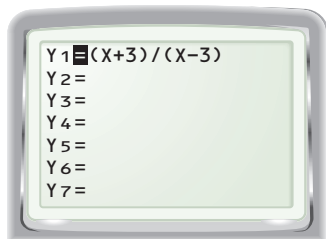
Most graphing calculators have two graphing modes: *connected* mode and *dot* mode. *Connected* mode displays the graph of a rational function as a smooth curve, while *dot* mode displays the graph as a series of dots.

EXAMPLE Graph a rational function

Graph $y = \frac{x+3}{x-3}$.

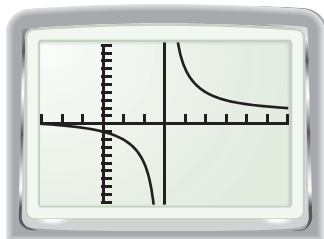
STEP 1 Enter function

Enter the rational function, using parentheses.



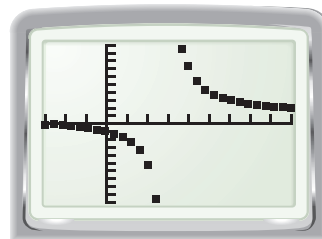
STEP 2 Use connected mode

Graph the function in *connected* mode.



STEP 3 Use dot mode

Graph the function in *dot* mode.



The graph in Step 2 includes a vertical line at approximately $x = 3$. This line is *not* part of the graph. It is simply the graphing calculator's attempt at connecting the two branches of the graph.

PRACTICE

Use a graphing calculator to graph the rational function. Choose a viewing window that displays the important characteristics of the graph.

1. $y = \frac{5}{x} + 2$
2. $y = 7 - \frac{3}{x}$
3. $y = 4 + \frac{2}{x-5}$
4. $y = \frac{6}{x+1} + 2$
5. $y = \frac{7}{2x+8}$
6. $y = \frac{9-2x}{x-3}$
7. $f(x) = \frac{x-4}{x+2}$
8. $g(x) = \frac{5x-2}{3x+9}$

9. **SKATEBOARDING** You are trying to decide whether it is worth joining a skate park. It costs \$100 to join and then \$4 for each visit. Write a function that gives the average cost y per visit after x visits. Graph the function. What happens to the average cost as the number of visits increases? What are a reasonable domain and range for the function?