

5.2 Set a Good Viewing Window

TEKS a.5, a.6, 2A.4.B

QUESTION What is a good viewing window for a polynomial function?

When you graph a function with a graphing calculator, you should choose a viewing window that displays the important characteristics of the graph.

EXAMPLE Graph a polynomial function

Graph $f(x) = 0.2x^3 - 5x^2 + 38x - 97$.

STEP 1 Graph the function

Graph the function in the standard viewing window.



$-10 \leq x \leq 10, -10 \leq y \leq 10$

STEP 2 Adjust horizontally

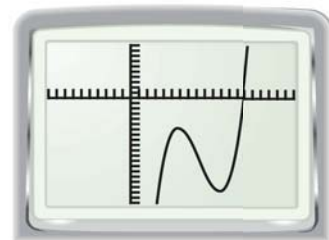
Adjust the horizontal scale so that the end behavior of the graph as $x \rightarrow +\infty$ is visible.



$-10 \leq x \leq 20, -10 \leq y \leq 10$

STEP 3 Adjust vertically

Adjust the vertical scale so that the turning points and end behavior of the graph as $x \rightarrow -\infty$ are visible.



$-10 \leq x \leq 20, -20 \leq y \leq 10$

PRACTICE

Find intervals for x and y that describe a good viewing window for the graph of the polynomial function.

- $f(x) = x^3 + 4x^2 - 8x + 11$
- $f(x) = -x^3 + 36x^2 - 10$
- $f(x) = x^4 - 4x^2 + 2$
- $f(x) = -x^4 - 2x^3 + 3x^2 - 4x + 5$
- $f(x) = -x^4 + 3x^3 + 15x$
- $f(x) = 2x^4 - 7x^3 + x - 8$
- $f(x) = -x^5 + 9x^3 - 12x + 18$
- $f(x) = x^5 - 7x^4 + 25x^3 - 40x^2 + 13x$

9. **REASONING** Let $g(x) = f(x) + c$ where $f(x)$ and $g(x)$ are polynomial functions and c is a positive constant. How is a good viewing window for the graph of $f(x)$ related to a good viewing window for the graph of $g(x)$?

10. **BASEBALL** From 1994 to 2003, the average salary S (in thousands of dollars) for major league baseball players can be modeled by

$$S(x) = -4.10x^3 + 67.4x^2 - 121x + 1170$$

where x is the number of years since 1994. Find intervals for the horizontal and vertical axes that describe a good viewing window for the graph of S .