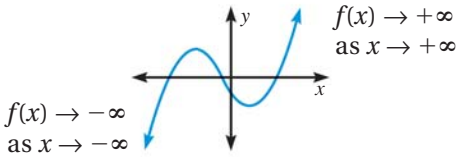
END BEHAVIOR The **end behavior** of a function's graph is the behavior of the graph as x approaches positive infinity ($+\infty$) or negative infinity ($-\infty$). For the graph of a polynomial function, the end behavior is determined by the function's degree and the sign of its leading coefficient.

READING
The expression "$x \to +\infty$" is read as "x approaches positive infinity."

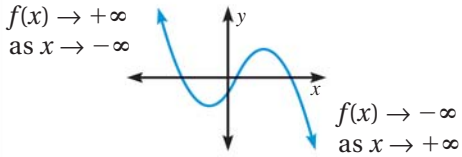
KEY CONCEPT *For Your Notebook*

End Behavior of Polynomial Functions

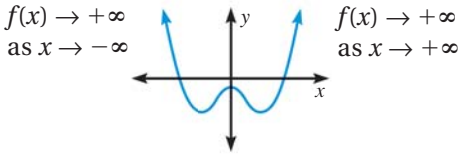
Degree: odd
Leading coefficient: positive



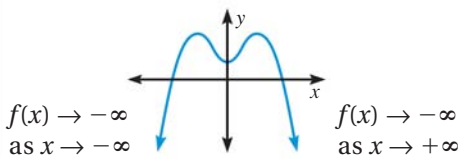
Degree: odd
Leading coefficient: negative



Degree: even
Leading coefficient: positive

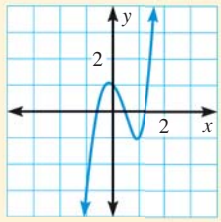


Degree: even
Leading coefficient: negative



EXAMPLE 4 TAKS PRACTICE: Multiple Choice

What is true about the degree and leading coefficient of the polynomial function whose graph is shown?



Ⓐ Degree is odd; leading coefficient is positive

Ⓑ Degree is odd; leading coefficient is negative

Ⓒ Degree is even; leading coefficient is positive

Ⓓ Degree is even; leading coefficient is negative

From the graph, $f(x) \to -\infty$ as $x \to -\infty$ and $f(x) \to +\infty$ as $x \to +\infty$. So, the degree is odd and the leading coefficient is positive.

▶ The correct answer is A. Ⓐ Ⓑ Ⓒ Ⓓ

GUIDED PRACTICE for Examples 3 and 4

Use synthetic substitution to evaluate the polynomial function for the given value of x.

6. $f(x) = 5x^3 + 3x^2 - x + 7; x = 2$
7. $g(x) = -2x^4 - x^3 + 4x - 5; x = -1$
8. *Describe* the degree and leading coefficient of the polynomial function whose graph is shown.