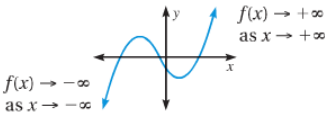
72 End Behavior of Polynomial Functions

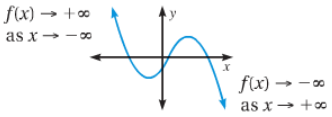
KEY CONCEPT *For Your Notebook*

End Behavior of Polynomial Functions

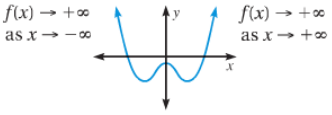
Degree: odd
Leading coefficient: positive



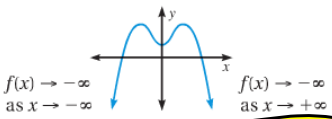
Degree: odd
Leading coefficient: negative



Degree: even
Leading coefficient: positive



Degree: even
Leading coefficient: negative



"... as x approaches infinity"
or
"...as x increases without bound."

$f(x) = -3x^4 + 2x^2 - 8$

As $x \to -\infty$, $f(x)$ decreases

Degree: Odd or Even 4 ↑↗ or ↙↘

As $x \to +\infty$, $f(x)$ decreases

Leading Coefficient: Positive or Negative (right end)

$f(x) = 4x^5 + 3x^3 + 7x^2 + 2$

Degree: Odd or Even 5 ↑↓ or ↙↗

As $x \to -\infty$, $f(x)$ decreases

As $x \to +\infty$, $f(x)$ increases

Leading Coefficient: Positive or Negative 4 (right end)

$f(x) = \frac{1}{2}x^6 - 3x^3 + 2x + 6$

As $x \to -\infty$, $f(x)$ increases

Degree: Odd or Even 6 ↑↗ or ↙↘

As $x \to +\infty$, $f(x)$ increases

Leading Coefficient: Positive or Negative $\frac{1}{2}$ (right end)

$f(x) = -x^3 + 4x - 7$

Degree: Odd or Even 3 ↑↓ or ↙↗

As $x \to -\infty$, $f(x)$ increases

Leading Coefficient: Positive or Negative −1 (right end)

As $x \to +\infty$, $f(x)$ decreases