Functions

Objective:

- Determine End Behaviors

End Behavior of Functions

The end behavior of a graph describes the far left and the far right portions of the graph.

Using the leading coefficient and the degree of the polynomial, we can determine the end behaviors of the graph. This is often called the Leading Coefficient Test.

End Behavior of Functions

First determine whether the degree of the polynomial is even or odd.

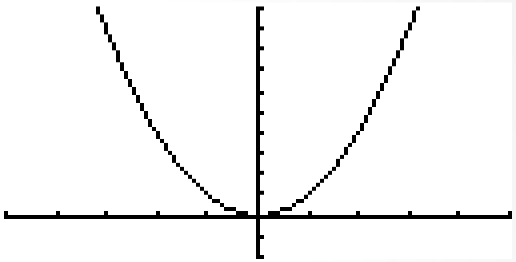
$f(x) = 2x^2 + 3x - 5$ degree = 2 so it is **even**

Next determine whether the leading coefficient is positive or negative.

$f(x) = 2x^2 + 3x - 5$ Leading coefficient = 2 so it is **positive**

END BEHAVIOR

$$f(x) = x^2$$



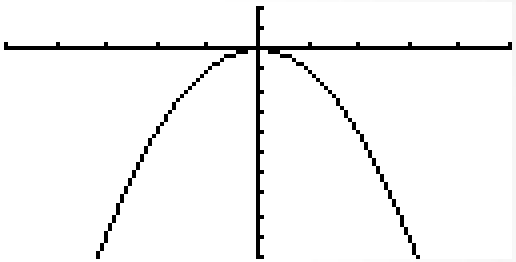
Degree: Even

Leading Coefficient: +

End Behavior: Up Up ↖ ↗

END BEHAVIOR

$$f(x) = -x^2$$



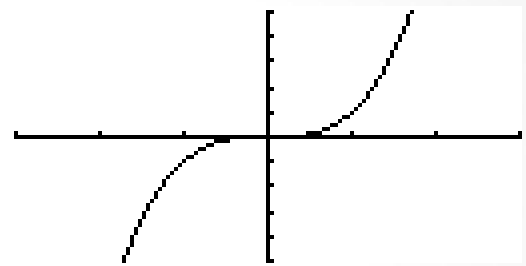
Degree: Even

Leading Coefficient: −

End Behavior: Down Down

END BEHAVIOR

$$f(x) = x^3$$



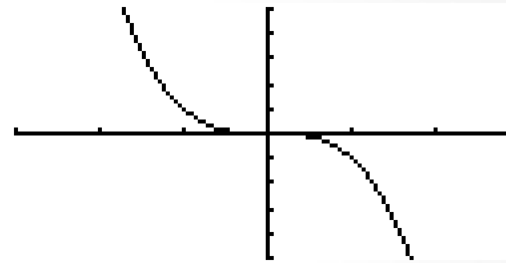
Degree: Odd

Leading Coefficient: +

End Behavior: Down Up

END BEHAVIOR

$$f(x) = -x^3$$



Degree: Odd

Leading Coefficient: −

End Behavior: Up Down

END BEHAVIOR

PRACTICE

Give the End Behavior:

a. $f(x) = -2x^3 + 5x - 9$

b. $f(x) = 4x^4 - 2x^2 + 6x - 3$

c. $f(x) = 4x^5 - 3x^2 + 2x$

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

END BEHAVIOR

PRACTICE

Give the End Behavior:

a. $f(x) = -2x^3 + 5x - 9$ Up Down

b. $f(x) = 4x^4 - 2x^2 + 6x - 3$ Up Up

c. $f(x) = 4x^5 - 3x^2 + 2x$ Down Up

d. $f(x) = -3x^4 + 2x^3 - x^2 + 3x - 4$ Down Down