

### End Behavior and y Intercept

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

**Degree (leading exponent)** specifies left-end behavior:  
 Even = same as right  
 Odd = Opposite of right

**Leading coefficient** specifies right-end behavior:  
 Positive = up on right  
 Negative = down on right

**Trailing constant** is the y-intercept

### Table

Some people prefer to memorize a table of leading coefficient vs. degree:

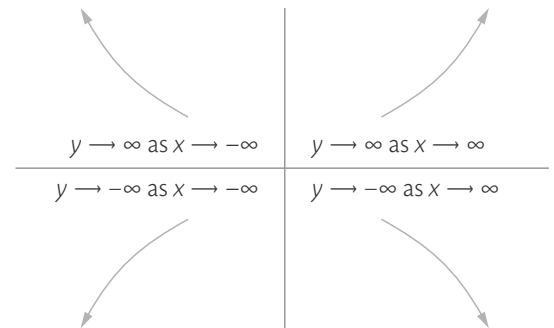
		Coefficient	
		+	-
Degree	E	↑↑	↓↓
	O	↓↑	↑↓

### Reporting End Behavior

End behavior should be reported using the form

$$"y \rightarrow \pm\infty \text{ as } x \rightarrow \pm\infty"$$

The four possibilities are diagrammed at right.



### Repeated zeros and multiplicity

If a polynomial has a binomial factor that is raised to a power  $(x - a)^k$ , this represents a repeated root of multiplicity  $k$ . That is, the polynomial will have  $k$  roots all with the same value,  $a$ .

When graphing this root:

- If the **multiplicity is 1**, the graph crosses the x-axis at  $a$ .
- If the **multiplicity is odd**, but not 1, the graph "slides" across the x-axis at  $a$ .
- If the **multiplicity is even**, the graph touches but doesn't cross the x-axis at  $a$ .

