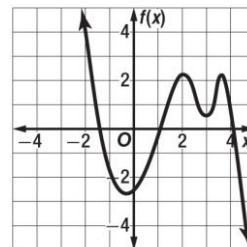
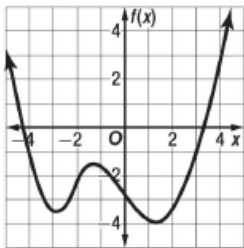
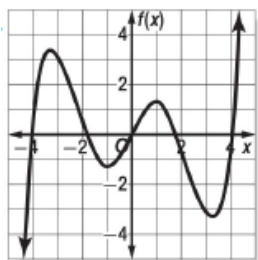


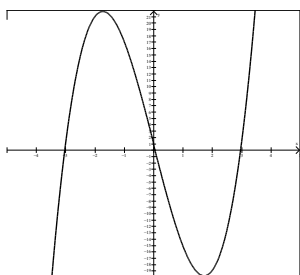
### 5.3 day 2 Investigating Graphs of Polynomial Functions

#### Warm-Up:

Describe the end behavior of each graph below, state the number of real zeros, and identify if odd or even degree:



We also need to be able to describe end behavior of a function by looking at its equation. The leading coefficient and the degree of the function affect end behavior.



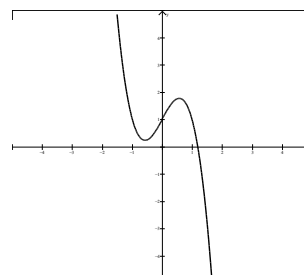
$$f(x) = 2x^3 - 18x + 1$$

Leading coefficient: \_\_\_\_\_

Degree of the function: \_\_\_\_\_

Right end behavior: As  $x \rightarrow \infty$ , \_\_\_\_\_

Left end behavior: As  $x \rightarrow -\infty$ , \_\_\_\_\_



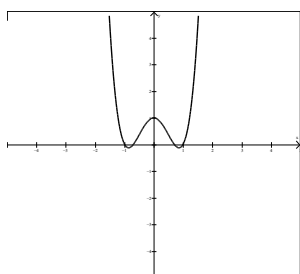
$$f(x) = -2x^3 + 2x + 1$$

Leading coefficient: \_\_\_\_\_

Degree of the function: \_\_\_\_\_

Right end behavior: As  $x \rightarrow \infty$ , \_\_\_\_\_

Left end behavior: As  $x \rightarrow -\infty$ , \_\_\_\_\_



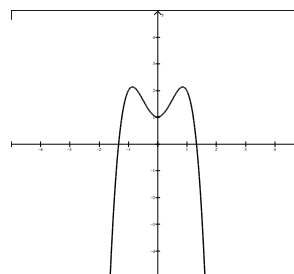
$$f(x) = 2x^4 - 3x^2 + 1$$

Leading coefficient: \_\_\_\_\_

Degree of the function: \_\_\_\_\_

Right end behavior: As  $x \rightarrow \infty$ , \_\_\_\_\_

Left end behavior: As  $x \rightarrow -\infty$ , \_\_\_\_\_



$$f(x) = -2x^4 + 3x^2 + 1$$

Leading coefficient: \_\_\_\_\_

Degree of the function: \_\_\_\_\_

Right end behavior: As  $x \rightarrow \infty$ , \_\_\_\_\_

Left end behavior: As  $x \rightarrow -\infty$ , \_\_\_\_\_

### Rules for Determining End Behavior of Polynomial Functions:

If the leading coefficient is positive, the right end goes \_\_\_\_\_.

If the leading coefficient is negative, the right end goes \_\_\_\_\_.

Even degree functions relate directly to a parabola and both the left & right ends: \_\_\_\_\_

Odd degree functions relate directly to a line and so the left end: \_\_\_\_\_

---

**Determine the ending behavior of each function based on its degree and leading coefficient.**

Ex.  $p(x) = 3x^3 - x^2 + 2x - 5$

**Degree:**

**Leading coefficient:**

**Ending behavior:**

1.  $p(x) = -x^5 + 4x^3$

**Degree:**

**leading coefficient:**

**ending behavior:**

Ex:  $p(x) = -7x^2 + 5x + 9$

**Degree:**

**Leading coefficient:**

**Ending behavior:**

2.  $f(x) = 3x^4 + 6x^3 - x^2 + 12$

**Degree:**

**Leading coefficient:**

**Ending behavior:**

Ex:  $g(x) = 100 - 5x^3 + 10x^7$

**Standard form:**

**Degree:**

**Leading coefficient:**

**Ending behavior:**

3.  $p(x) = 4x^6 + 6x^4 + 8x^8 - 10x^2 + 20$

**Standard form:**

**Degree:**

**Leading coefficient:**

**Ending behavior:**