Algebra 2/Trig Name_____
Possible roots/zeros of polynomials functions Block _____Date _____

**Polynomial Function**:

- A function in the form $f(x)=a_nx^n+a_{n-1}x^{n-1}+...+a_1x+a_0, a_n\neq 0$ where $a_i$ is a real number.
- It has a **leading coefficient** of $a_n$ and **degree** *n*.
- The graph must be **continuous** and have only smooth, rounded turns.

**Examples**: Find the leading coefficient and degree of each polynomial function.

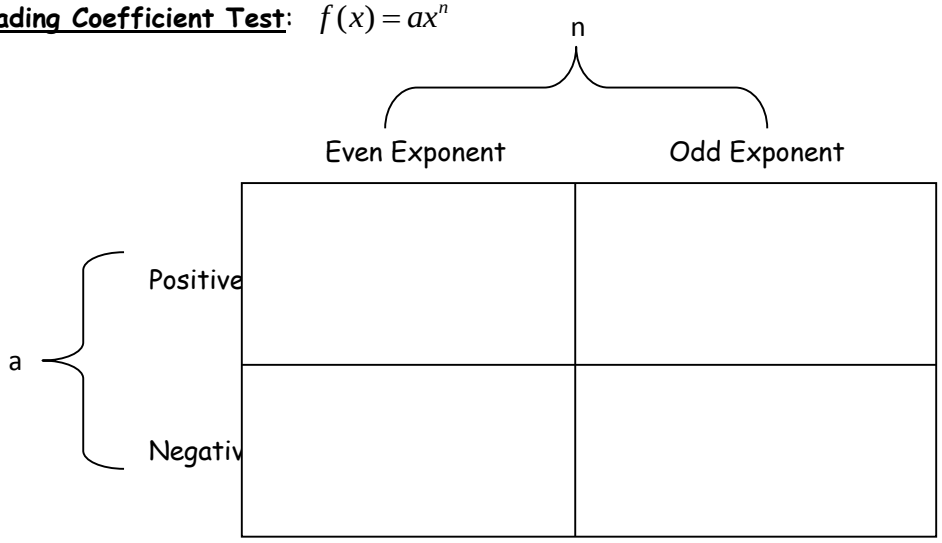
| **Polynomial Function** | **Leading Coefficient** | **Degree** |
|---|---|---|
| 1. $f(x)=-2x^5+3x^3-5x+1$ | | |
| 2. $f(x)=x^3+6x^2+7$ | | |
| 3. $f(x)=14$ | | |

**Power Function**:

- Polynomial function of the form $f(x)=x^n$
- Even or Odd

**Examples**: **Even** **Odd**

**Leading Coefficient Test**: $f(x)=ax^n$




**Examples**: Apply the leading coefficient test to describe the right-hand and left-hand behavior of the graph.

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

**Finding the Zeros of a Polynomial Function**:

- Factor completely and solve for x.

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

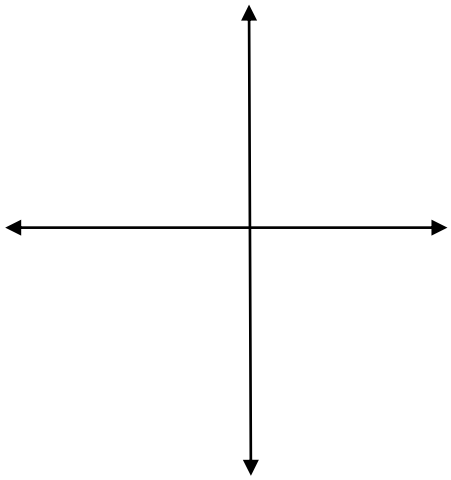
**Real Zeros of Polynomial Functions**:

If *f* is a polynomial function and *a* is a real number, the following statements are equivalent.

- x = 2 is a _____of the function *f.*
- x = 2 is a _____ of the polynomial equation *f(x)=0.*
- (x – 2) is a _____ of the polynomial *f(x).*
- (2,0) is an _____ of the graph of *f.*

**Sketching the Graph of a Polynomial Function**:

- 1. Apply the Leading Coefficient Test.
- 2. Find the Zeros of the Polynomial.
- 3. Plot a few additional points.
- 4. Draw the graph.



**Examples Together**:

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

2. $f(x) = x^3 - 12x^2 + 36x$

**More Examples On Your Own**:

3. $f(x) = 3x^4 - 4x^3$

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

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

6. $f(x) = x^3 - 5x$

7. $f(x) = -3x^5 + 8x^3 - 4x$

8. $g(x) = -x^2 + 5x - 3$