**Guided Notes: Graph of Polynomial Functions Name:**

* Graphs of polynomial functions are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. That is, they have no breaks, holes, or gaps.
* Polynomial functions are also \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_with rounded turns.

*x*

*y*

*x*

*y*

*x*

*y*

Continuous: YES or NO

Smooth: YES or NO

Polynomial: YES or NO

Continuous: YES or NO

Smooth: YES or NO

Polynomial: YES or NO

* You can tell a lot about a polynomial function from its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ Degree: The largest \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_in your function.
	+ Leading Coefficient: The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_in front of the highest exponent (Degree).

|  |  |  |
| --- | --- | --- |
| **Polynomial Function** | **Degree** | **Leading Coefficient** |
|  |  |  |
|  |  |  |
|  |  |  |

**End Behavior:**

* If the degree is \_\_\_\_\_\_\_\_, both ends of the graph will continue in the same direction
	+ If the leading coefficient is positive, both ends will go to \_\_\_\_\_\_\_\_
	+ If the leading coefficient is negative, both ends will got to \_\_\_\_\_\_\_\_
* If the degree is \_\_\_\_\_\_\_\_, both ends of the graph will continue in the opposite directions
	+ If the leading coefficient is positive, the left end will go to \_\_\_\_\_ and the right end will go to \_\_\_\_\_\_
	+ If the leading coefficient is negative, the left end will go to \_\_\_\_\_ and the right end will go to \_\_\_\_\_\_
* The greater the value of *your degree* ,the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the graph will be near the origin

**Fundamental Theorem of Algebra -- Polynomial function *f* of degree *n*,the following statements are true.**

1. The function *f* has, at most, *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* real zeros.
2. The graph of *f* has, at most, *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* turning points.

**For each polynomial below, determine the maximum number of real zeros and the maximum number of turns:**

Max real zeros = \_\_\_\_\_\_

Max # of turns = \_\_\_\_\_\_

Max real zeros = \_\_\_\_\_\_

Max # of turns = \_\_\_\_\_\_

Max real zeros = \_\_\_\_\_\_

Max # of turns = \_\_\_\_\_\_

**Identify the following key features for each polynomial:**

Degree: EVEN or ODD

End Behavior: SAME or OPPOSITE

Leading Coefficient: + or

(Left End),

 (Right End),

Y-Intercept @ \_\_\_\_\_\_\_\_\_\_

Max Real Zeros = \_\_\_\_\_\_\_\_

Max # of Turns = \_\_\_\_\_\_\_\_

Degree: EVEN or ODD

End Behavior: SAME or OPPOSITE

Leading Coefficient: + or

(Left End),

 (Right End),

Y-Intercept @ \_\_\_\_\_\_\_\_\_\_

Max Real Zeros = \_\_\_\_\_\_\_\_

Max # of Turns = \_\_\_\_\_\_\_\_

***Using the graph given, identify a possible degree for the polynomial.***



1. Degree must be: EVEN ODD

Leading Coefficient:

How many real solutions? \_\_\_\_\_

Number of Turns: \_\_\_\_\_\_\_\_\_\_\_\_\_

Lowest possible Degree = \_\_\_\_\_\_\_

2. Degree must be: EVEN ODD

Leading Coefficient:

How many real solutions? \_\_\_\_\_

Number of Turns: \_\_\_\_\_\_\_\_\_\_\_\_\_

Lowest possible Degree = \_\_\_\_\_\_\_

3. Degree must be: EVEN ODD

Leading Coefficient:

How many real solutions? \_\_\_\_\_

Number of Turns: \_\_\_\_\_\_\_\_\_\_\_\_\_

Lowest possible Degree = \_\_\_\_\_\_\_

4. Degree must be: EVEN ODD

Leading Coefficient:

How many real solutions? \_\_\_\_\_

Number of Turns: \_\_\_\_\_\_\_\_\_\_\_\_\_

Lowest possible Degree = \_\_\_\_\_\_\_



5. Degree must be: EVEN ODD

Leading Coefficient:

How many real solutions? \_\_\_\_\_

Number of Turns: \_\_\_\_\_\_\_\_\_\_\_\_\_

Lowest possible Degree = \_\_\_\_\_\_\_



6. Degree must be: EVEN ODD

Leading Coefficient:

How many real solutions? \_\_\_\_\_

Number of Turns: \_\_\_\_\_\_\_\_\_\_\_\_\_

Lowest possible Degree = \_\_\_\_\_\_\_