Math 3 4.4 Polynomial Rates of Change Unit 4

*EQ: How can we explore how quickly polynomial functions increase and decrease?*

In as many ways as possible, compare and contrast linear, quadratic, and exponential functions.

**Example 1:** Use the following functions to help answer the statements below.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |

1. Write the following expressions in order from **least to greatest** when the value of x is zero.
2. Do you think this order would change when x represents other numbers?
3. Write the same expressions from **least to greatest** when x represents a very large number (this number is so large it is close to or approaching positive infinity).
4. Write the same expressions in order from **least to greatest** when x represents a number that is approaching negative infinity.
5. When comparing expressions, how does the order change depending on the values of x (close to negative infinity, zero, and positive infinity)?
6. Determine where you would insert the following expression in question c.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |

1. Now insert these same expressions into your list in question d.
2. Write your process for ordering one variable polynomial expressions for both extremes (when x approaches infinity as well as when x approaches negative infinity).

End Behavior: Defined by what is going on at the *ends* of a graph.

|  |  |  |
| --- | --- | --- |
|  | **Even** Degree Polynomial | **Odd** Degree Polynomial |
| **Positive** Leading Coefficient | Image result for blank coordinate plane | Image result for blank coordinate plane |
| **Negative** Leading Coefficient | Image result for blank coordinate plane | Image result for blank coordinate plane |

**Example 1:** Find the end behavior based on your knowledge of the function.

Degree:

LC:

End Behavior:

Degree:

LC:

End Behavior:

Degree:

LC:

End Behavior:

Degree:

LC:

End Behavior:

Degree:

LC:

End Behavior:

Degree:

LC:

End Behavior:

Degree:

LC:

End Behavior:

Degree:

LC:

End Behavior:

Degree:

LC:

End Behavior: