

**Examples: Describe the function as exponential growth, decay, bounded growth, or bounded decay.**

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| 1.) | 2.) | 3.) |
| 4.) | 5.) | 6.) |
| 7.) | 8.) | 9.) |

**For exponential functions of the form,**

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**the following characteristics exist:**

**Domain:** The values that we can put in for **\_\_\_\_\_**. Since the graph of every exponential function expands in **\_\_\_\_\_\_\_\_\_\_\_\_** directions (**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**), the domain of all exponential functions is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (\_\_\_\_\_\_).

**Horizontal Asymptote:** A dashed line that the exponential function approaches more and more closely, but **\_\_\_\_\_\_\_\_\_\_\_\_** touches. The equation of the asymptote is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**Range:** The values that we can get out for \_\_\_\_\_\_\_\_. Since there are different shapes exponential functions can have, the range **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** on the value of **\_\_\_\_\_\_\_\_\_\_\_\_.**

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| --- | --- |
| **If a > 0, then the range is…** | **If a < 0, then the range is…** |
|  |  |
| \*because k is the value of the asymptote, the range can NEVER be **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** to k. | |

**X-Intercept:** The point where the graph crosses the x-axis (**\_\_\_\_\_\_\_\_\_\_\_**). At this point our ability to solve by hand is limited. Therefore, an exponential function may have one of the following x-intercepts based on our available information.

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| **Point (x, 0)** | **N/A**  \*there is no x-intercept because the graph does not cross the x-axis. | **Cannot Determine**  \*there is an x-intercept, but we can’t figure it out based on the information we have. |

**Y-Intercept:** The point where the graph crosses the y-axis (**\_\_\_\_\_\_\_\_\_\_\_**). To find the y-intercept algebraically, plug in zero for x and solve for y. \*There is ALWAYS a y-intercept.

**Intervals of Increase or Decrease**: Exponential functions can only do **\_\_\_\_\_\_\_\_\_** or the other…**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** both.

|  |  |
| --- | --- |
| **Increasing :** | **Decreasing :** |
|  |  |
| \*make sure to **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** increase or decrease! | |

**End Behavior:** What does **\_\_\_\_\_** approach as x becomes are larger **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and larger **\_\_\_\_\_\_\_\_\_\_\_\_\_** number?

|  |  |
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| **Exponential Growth:** | **Exponential Decay:** |
| **Bounded Growth:** | **Bounded Decay:** |

**Example: Describe the characteristics for the exponential function.**

|  |  |
| --- | --- |
|  | |
| **Domain: \_\_\_\_\_\_\_\_\_\_\_**  **Horizontal Asymptote:**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Range: \_\_\_\_\_\_\_\_\_\_\_\_\_**  **X-Intercept; \_\_\_\_\_\_\_\_\_**  **Y-Intercept: \_\_\_\_\_\_\_\_\_** | **Interval of Increase or Decrease:**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **End Behavior:** |

**Example: Describe the characteristics for the exponential function.**

|  |  |
| --- | --- |
|  | |
| **Domain: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Horizontal Asymptote:**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **Range: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **X-Intercept: \_\_\_\_\_\_\_\_\_\_\_\_**  **Y-Intercept: \_\_\_\_\_\_\_\_\_\_\_\_** | **Interval of Increase or Decrease: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **End Behavior:** |