GSE Algebra 1 **7.7 – Exponential shifts** Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Exponentials have two graphs, **GROWTH** and **DECAY**.

**ALL OF THESE GRAPHS START AT (0, 1)!**

|  |  |
| --- | --- |
| GROWTH$$y=2^{x}$$***PARENT GRAPH***Asymptote: y-int:   | $$y=2^{x}+3$$How do we move? Asymptote: y-int:   |
| $$y=2^{(x-3)}$$How do we move? Asymptote: y-int:   | $$y=-1(2)^{x}$$How do we move? Asymptote: y-int:   |
| $$y=4(2)^{x}$$How do we move? Asymptote: y-int:   | $$y=\frac{1}{2}(2)^{x}$$How do we move? Asymptote: y-int:   |
| $$y=2^{(x+2)}-2$$How do we move? Asymptote: y-int:   | $$y=3(2)^{x}-4$$How do we move? Asymptote: y-int:   |
| DECAY$$y=\frac{1}{2}^{x}-4$$How do we move? Asymptote: y-int:   | $$y=\frac{1}{2}^{(x+3)}$$How do we move? Asymptote: y-int:   |
| $$y=2(\frac{1}{2})^{x}-2$$How do we move? Asymptote: y-int:   | $$y=-(\frac{1}{2})^{x}$$How do we move? Asymptote: y-int:   |

* When you are in the exponent, you move \_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_ (think opposite)
* When you are in the back of the equation (\_\_\_\_\_\_\_\_\_\_\_\_\_) you move \_\_\_\_\_ or \_\_\_\_\_\_\_\_\_
* **BIG** **DIFFERENCE** **BETWEEN** **GROWTH** AND **DECAY** IS

Write the equations for the following specific scenarios.

1. An exponential growth that has been shifted right 5 units and down 3 units.
2. A quadratic that has been reflected over the x-axis and left 3 units.
3. An exponential decay that has been vertically stretch by a factor of 10.
4. An exponential growth that has an asymptote of 4 and moved right 2 units.
5. A quadratic that has been horizontally stretched by ¼ and moved down 6 units.
6. A line that has a slope of 10 and a y-intercept of 2.
7. An exponential decay that has been vertically shrunk by a factor of 1/6 and reflected over the x-axis.
8. An exponential growth that has been moved left 8 units and has an asymptote of -4.