Exponential Match-Up                                        Name:____________________________

Yesterday we explored how the height of a bouncing ball could be modeled by an exponential relationship. Today we'll look at more graphs of exponential equations and use what we know about transformations to match the graphs to their equations.

1. Match graphs A-F with their equation. Record your results in the table.

| **Graph** | **Equation** |
|---|---|
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2. How can you tell from an equation whether the function models exponential growth or decay?

3. One extra equation card turned up that wasn't part of your original set! Which graph would this match with? How do you know?

$$y = 2^{-x}$$

4. Explain why it is possible that one graph could represent two different equations.

5. Match graphs G-L with their equation. Record your results in the table.

| **Graph** | **Equation** |
|---|---|
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6. Petra believes that graph **L** represents the parent function $y = 3^x$ after it has been shifted to the left one unit. Pierre believes that graph **L** represents the parent function $y = 3^x$ after it has been vertically stretched by a factor of 3. Who is correct? Give a convincing reason.

# Section 3.2—Graphs of Exponential Functions

Important Ideas:

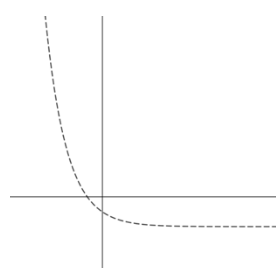
## Check Your Understanding!

1. The parent function $y = 2^x$ was reflected across the y-axis and shrunk by a factor 1/3. Write the equation of the resulting function.

2. Let $g(x) = 2^{x+1} + 6$.
   a) List the parent function and describe what transformations occurred to produce $g(x)$.
   b) What is the domain of $g(x)$? What is the range of $g(x)$?
   c) Find the y-intercept of $g(x)$.
   d) Write the equations of any asymptotes of $g(x)$.

3. An exponential function of the form $f(x) = a^x + c$ is shown. Which of the following statements MUST be true?

   A) $c < -1$
   B) $a = \frac{1}{2}$
   C) $a + c > 0$
   D) $0 < a < 1$



4. The equation for graph **G** in the card sort was $y = 2^{x-1}$. Write an alternate equation for graph **G** that uses a vertical dilation instead of a horizontal shift. Prove that the two equations are equivalent.

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