7.2 Day 1 Notes
Writing Exponential Functions
$y = ab^x$

- Parent function: $y = b^x$ will always intercept the y axis at _____.
- If a vertical stretch is being applied in the form of $y = ab^x$, the y intercept occurs at _____.
- Therefore, the y intercept of an exponential function will always determine _____.

Example: Write an exponential function whose graph passes through the points (0,3) & (3, 24).

Step 1: Write the equation $y = ab^x$ replacing "a" with the y intercept. $y =$ _____b^x

Step 2: Substitute in the values of x & y from the second point and solve for "b."

$y = 3b^x \quad \rightarrow \quad$ _____ $= 3(b)$——

Step 3: Write the full equation: $y = ab^x$ with values of a & b inserted.

Practice: Write an exponential function for the graph that passes through the given points.

1. (0, 4) and (2, 36)

2. (0, 5) and (6, 320)

Calculator!! Exponential regression.

3. (0, 256) and (4, 81)

4. (0,6.4) and (3, 100)

Application: An experiment starts with 7500 bacteria cells. After 4 hours there are 23,000 cells. Write an exponential function to model the number of cells after x hours.

Compound Interest

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

Example:

An investment pays 4.2% annual interest compounded monthly. If $2500 is invested, what will be the balance after 15 years?

1. Determine how much is in a retirement account after 20 years if $5,000 was invested at 6.05% interest, compounded weekly.

   What is the difference in the balance if the interest is compounded daily?

2. A college savings account pays 8.2% annual interest, compounded semi-annually. What is the balance after 12 years if $21,000 was initially invested?

   What is the ending balance if the current interest rate is only 2.1%?