Module 13: Student Activity

Calculating Exponential Change

Remember that the **b** value in the general form $y = ab^x$ represents the growth or decay of the initial value. If the **b** value is 1, then no growth or decay happens. If you are told that the initial value changes by a **percent**, then we can represent the **b** value as growth or decay where **r** is the decimal form of the percent:

Growth is $1 + r$ Decay is $1 - r$

1. **Write an equation that represents the following situation: Starting value of 125, 6% growth per year, over 10 years.**

2. **Write an equation that represents the following situation: Starting value of 200, 2.5% decay per year, over 5 years.**

Now use what you know about writing exponential functions with percent growth or decay to complete the following problems.

3. **Farid makes a $12,000 investment that yields an average yearly return of 4%. If he makes no additional investments, how much will his investment be worth in 15 years?**

4. **You purchase a car for $36,000. You did some research and found that this particular model of car depreciates in value by around 15% per year. What is the value of your car after 6 years?**

5. **You make an investment where the balance over time can be modeled by the equation $y = 32000(1.035)^x$, where x represents the number of years since the investment started and y represents your total balance after x years.**
    a. What is the starting balance of your investment?
    b. What is the rate of growth of your investment?

6. **$y = 100(0.96)^x$ is an equation that can be used to represent the purchasing power of $100 after x years of inflation. What is the rate of inflation used to make this calculation?**