

4.3.1: Graphs and Properties of Exponential Growth and Decay Functions (Exercises)

SECTION 4.3 PROBLEM SET: GRAPHS AND PROPERTIES OF EXPONENTIAL GROWTH AND DECAY FUNCTIONS

In questions 1-4, let t = time in years and y = the value at time t or y = the size of the population at time t . The domain is the set of non-negative values for t ; $t \geq 0$, because y represents a physical quantity and negative values for time may not make sense. For each question:

- Write the formula for the function in the form $y = ab^t$
- Sketch the graph of the function and mark the coordinates of the y-intercept.

1. A house was purchased for \$350,000 in the year 2010. The value has been increasing at the rate of 2% per year.	2. A population of a certain species of bird in a state park has 300 birds. The population is decreasing at the rate of 7% year.
3. A lab buys equipment \$50,000. Its value depreciates over time. The value decreases at the rate of 6% annually.	4. A population of bats in a cave has 200 bats. The population is increasing at the rate of 5% annually.

In questions 5-8, let t = time in years and y = the value at time t or y = the size of the population at time t . The domain is the set of non-negative values for t ; $t \geq 0$, because y represents a physical quantity and negative values for time may not make sense. For each question:

- Write the formula for the function in the form $y = ae^{kt}$
- Sketch the graph of the function and mark the coordinates of the y-intercept.

5. A population of 400 microbes increases at the continuous growth rate of 26% per day.	6. The price of a machine needed by a production factory is \$28,000. Due to inflation the price of the machine is increasing at the continuous rate of 3.5% per year.
7. A population of an endangered species consists of 4000 animals of that species. The population is decreasing at the continuous rate of 12% per year.	8. A business buys a computer system for \$12000. The value of the system is depreciating and decreases at the continuous rate of 20% per year.

For questions 9-12

- Sketch a graph of exponential function.
- List the coordinates of the y intercept.
- State the equation of any asymptotes and state the whether the function approaches the asymptote as $x \rightarrow \infty$ or as $x \rightarrow -\infty$.
- State the domain and range.

9. $y = 10(1.5^x)$	10. $y = 10(e^{1.2x})$
11. $y = 32(0.75^x)$	12. $y = 200(e^{-0.5x})$

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