

Exponential Functions Worksheet

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Part 1: Building a Foundation

What is the general form of an exponential function?

Hint: Consider the structure of exponential functions.

- A) $f(x) = ax + b$
- B) $f(x) = a * b^x$
- C) $f(x) = a^x + b$
- D) $f(x) = a * x^b$

Which of the following are characteristics of exponential growth functions?

Hint: Think about the behavior of the graph as x increases.

- A) The base b is greater than 1.
- B) The graph decreases as x increases.
- C) The graph has a horizontal asymptote at $y = 0$.
- D) The y -intercept is at $(0, a)$.

Explain why the base b of an exponential function cannot be 1.

Hint: Consider the implications of having a constant function.

List the components of the exponential function $f(x) = a * b^x$.

Hint: Think about the parameters involved in the function.

1. What is the coefficient?

2. What is the base?

3. What is the exponent?

Part 2: Understanding and Interpretation

What happens to the graph of an exponential function when the base b is between 0 and 1?

Hint: Consider the direction of the graph as x increases.

- A) It represents exponential growth.
- B) It becomes a linear function.
- C) It represents exponential decay.
- D) It remains constant.

Which transformations affect the graph of an exponential function $f(x) = a \cdot b^x$?

Hint: Think about how the graph can be shifted or reflected.

- A) Vertical shift
- B) Horizontal shift
- C) Reflection over the x -axis
- D) Rotation around the origin

Describe how the graph of $f(x) = 2 \cdot 3^x$ changes if it is transformed to $f(x) = 2 \cdot 3^{\{x-2\}} + 1$.

Hint: Consider the effects of shifting and scaling.

Part 3: Application and Analysis

If a population of bacteria doubles every hour, which function models this growth?

Hint: Think about the characteristics of exponential growth.

- A) $f(x) = 100 \cdot 2^x$
- B) $f(x) = 100 \cdot x^2$
- C) $f(x) = 100 \cdot 0.5^x$
- D) $f(x) = 100 \cdot x$

In finance, which scenarios can be modeled using exponential functions?

Hint: Consider the nature of interest and asset values.

- A) Simple interest
- B) Compound interest
- C) Loan amortization
- D) Depreciation of assets

A certain radioactive substance decays at a rate of 5% per year. Write the exponential decay function representing this scenario.

Hint: Consider the initial amount and the decay rate.

Which of the following statements about the function $f(x) = 3 * (0.5)^x$ is true?

Hint: Analyze the behavior of the function as x increases.

- A) It represents exponential growth.
- B) It has a y-intercept at (0, 3).
- C) It has a horizontal asymptote at $y = 3$.
- D) It increases as x increases.

Part 4: Evaluation and Creation

Which function best models a scenario where a car's value decreases by 20% each year?

Hint: Think about the characteristics of exponential decay.

- A) $f(x) = 20000 * 0.8^x$
- B) $f(x) = 20000 * 1.2^x$
- C) $f(x) = 20000 * 0.2^x$
- D) $f(x) = 20000 * x^{0.8}$

You are designing a model for predicting the spread of a virus. Which factors should be considered in your exponential function model?

Hint: Think about the variables that influence the spread.

- A) Initial number of cases
- B) Rate of transmission
- C) Population density
- D) Recovery rate

Create an exponential function to model a scenario where a new technology's adoption rate is expected to triple every year. Explain your reasoning.

Hint: Consider the initial adoption rate and the growth factor.

