Exponential Functions Worksheet Graph The Functions

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Part 1: Building a Foundation

What is the general form of an exponential function?

Hint: Consider the structure of the function involving a base raised to a variable exponent.

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

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Hint: Think about the structure of exponential functions.

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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 > 1
- ☐ B) The graph is a straight line
- ☐ C) The graph increases rapidly
- ☐ D) The function has a horizontal asymptote at y = 0

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Explain what happens to the graph of an exponential function when the base b is between 0 and 1.

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List the components of the exponential function f(x) = a * b^x and describe their roles.

Hint: Think about what each part of the function represents.

1. What does 'a' represent?

2. What does 'x' represent?

3. What does ' b' represent?

Part 2: Understanding and Interpretation

If an exponential function is described by f(x) = 3 * 2^x, what is the y-intercept of the graph?

Hint: Evaluate the function at x = 0.

- ◯ A) 0
- ◯ B) 1
- ◯ C) 2
- ◯ D) 3

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- ◯ D) 3

Which transformations occur when f(x) = 2^x is changed to f(x) = 2^{x-3} + 4?

Hint: Consider how the function is shifted horizontally and vertically.

- ☐ A) Horizontal shift 3 units to the right
- ☐ B) Horizontal shift 3 units to the left
- ☐ C) Vertical shift 4 units up
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Describe how the graph of f(x) = 5 * (0.5)^x differs from the graph of f(x) = 5 * 2^x.

Hint: Think about the direction of the graphs and their behavior as x increases.

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Hint: Consider the direction and steepness of each graph.

Part 3: Application and Analysis

A population of bacteria doubles every hour. If the initial population is 100, which function models the population after x hours?

Hint: Consider how the population changes over time.

- ◯ A) f(x) = 100 * 2^x
- ◯ B) f(x) = 100 * x^2
- ◯ C) f(x) = 100 * (0.5)^x
- ◯ D) f(x) = 100 + 2x

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Hint: Think about the growth factor and initial amount.

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Which of the following real-world scenarios can be modeled by an exponential function?

Hint: Think about processes that involve growth or decay.

- [ ] A) The depreciation of a car's value over time
- [ ] B) The growth of a savings account with compound interest
- [ ] C) The linear increase in temperature over a day
- [ ] D) The decay of a radioactive substance

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Given the function f(x) = 3 * (1.5)^x, calculate the value of f(2) and interpret its meaning in a real-world context.

Hint: Substitute x = 2 into the function and think about what the result represents.

Given the function f(x) = 3 * (1.5)^x, calculate the value of f(2) and interpret its meaning in a real-world context.

Hint: Evaluate the function and explain the result.

Part 4: Evaluation and Creation

Which of the following changes to the function f(x) = 4 * 3^x would result in a graph that decreases instead of increases?

Hint: Think about how the base and coefficient affect the direction of the graph.

- ◯ A) Change the base to 1/3
- ◯ B) Change the coefficient to -4
- ◯ C) Add 5 to the function
- ◯ D) Subtract 5 from the function

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Evaluate the following scenarios and determine which would require a modification of the base in an exponential function:

Hint: Consider how the base affects the function's growth or decay.

- ☐ A) Modeling a faster rate of growth
- ☐ B) Adjust for a slower rate of decay
- ☐ C) Reflect the graph over the y-axis
- ☐ D) Shifting the graph vertically

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Create a real-world problem that can be modeled by an exponential function. Describe the situation, define the function, and explain how you would solve it.

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Create a real-world problem that can be modeled by an exponential function. Describe the situation, define the function, and explain how you would solve it.

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Propose a modification to the function f(x) = 2^x that would result in a horizontal shift to the left by 2 units and a vertical shift upwards by 3 units. Provide the new function and explain your reasoning.

Hint: Consider how to adjust the function to achieve the desired shifts.

1. What is the new function?

2. Why does this function represent the shifts?