Exponential Functions Worksheet Graph The Functions Answer Key PDF

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Part 1: Building a Foundation

What is the general form of an exponential function?

undefined. A) f(x) = a * x^ b

undefined. B) f(x) = a * b^x ✓

undefined. C) f(x) = a + b * x

undefined. D) f(x) = a * b * x

The general form of an exponential function is represented as f(x) = a * b^x.

What is the general form of an exponential function?

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undefined. B) f(x) = a * b^x ✓

undefined. C) f(x) = a + b * x

undefined. D) f(x) = a * b * x

The general form of an exponential function is typically expressed as f(x) = a * b^x.

Which of the following are characteristics of exponential growth functions?

undefined. A) The base b > 1 ✓

undefined. B) The graph is a straight line

undefined. C) The graph increases rapidly ✓

undefined. D) The function has a horizontal asymptote at y = 0 ✓

Exponential growth functions have a base greater than 1, increase rapidly, and have a horizontal asymptote at y = 0.

Which of the following are characteristics of exponential growth functions?

undefined. A) The base b > 1 ✓

undefined. B) The graph is a straight line

undefined. C) The graph increases rapidly ✓

undefined. D) The function has a horizontal asymptote at y = 0 ✓

Exponential growth functions have a base greater than 1 and increase rapidly.

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

When the base b is between 0 and 1, the graph of the exponential function decreases and approaches the x-axis but never touches it.

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

When the base b is between 0 and 1, the graph decreases and approaches the x-axis.

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

1. What does 'a' represent?

The initial value or y-intercept.

2. What does 'x' represent?

The exponent or input variable.

3. What does ' b' represent?

The base that determines the rate of growth or decay.

The components are 'a' (the initial value or y-intercept), 'x' (the exponent representing the input), and ' b' (the base determining growth or decay).

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?

undefined. A) 0

undefined. B) 1

undefined. C) 2
undefined. D) 3 ✓

The y-intercept is found by substituting x = 0 into the function, resulting in f(0) = 3.

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

undefined. A) 0
undefined. B) 1
undefined. C) 2
undefined. D) 3 ✓

The y-intercept is the value of the function when x = 0.

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

undefined. A) Horizontal shift 3 units to the right ✓
undefined. B) Horizontal shift 3 units to the left
undefined. C) Vertical shift 4 units up ✓
undefined. D) Vertical shift 4 units down

The function is shifted 3 units to the right and 4 units up.

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

undefined. A) Horizontal shift 3 units to the right ✓
undefined. B) Horizontal shift 3 units to the left
undefined. C) Vertical shift 4 units up ✓
undefined. D) Vertical shift 4 units down

The function undergoes a horizontal shift to the right and a vertical shift upwards.

Describe how the graph of f(x) = 5 * (0.5)^x differs from the graph of f(x) = 5 * 2^x.

The graph of f(x) = 5 * (0.5)^x decreases towards the x-axis, while f(x) = 5 * 2^x increases rapidly away from the x-axis.

Describe how the graph of f(x) = 5 * (0.5)^x differs from the graph of f(x) = 5 * 2^x.

The graph of f(x) = 5 * (0.5)^x decreases, while f(x) = 5 * 2^x increases.

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?

undefined. A) f(x) = 100 * 2^x ✓
undefined. B) f(x) = 100 * x^2
undefined. C) f(x) = 100 * (0.5)^x
undefined. D) f(x) = 100 + 2x

The correct function is f(x) = 100 * 2^x, which models the doubling behavior.

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

undefined. A) f(x) = 100 * 2^x ✓
undefined. B) f(x) = 100 * x^2
undefined. C) f(x) = 100 * (0.5)^x
undefined. D) f(x) = 100 + 2x

The function that models the population is an exponential function with a doubling factor.

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

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

Exponential functions can model scenarios like compound interest and radioactive decay.

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undefined. D) The decay of a radioactive substance ✓

Exponential functions can model scenarios like compound interest and radioactive decay.

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

Calculating f(2) gives the value 3 * (1.5)^2, which represents the quantity at that point in time.

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

Calculating f(2) gives insight into the growth after 2 units of time.

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?

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

Changing the base to 1/3 would result in a decreasing graph.

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

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

Changing the base to a fraction less than 1 will cause the graph to decrease.

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

undefined. A) Modeling a faster rate of growth ✓

undefined. B) Adjust for a slower rate of decay ✓

undefined. C) Reflect the graph over the y-axis

undefined. D) Shifting the graph vertically

Modifying the base is necessary for modeling faster growth or slower decay.

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

undefined. A) Modeling a faster rate of growth ✓

undefined. B) Adjust for a slower rate of decay ✓

undefined. C) Reflect the graph over the y-axis

undefined. D) Shifting the graph vertically

Modifying the base can change the rate of growth or decay in the function.

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.

An example could be modeling population growth or radioactive decay, defining the function based on the situation.

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.

A real-world problem could involve population growth or financial investments.

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.

1. What is the new function?

f(x) = 2^(x + 2) + 3

2. Why does this function represent the shifts?

The +2 shifts left and the +3 shifts up.

The new function would be f(x) = 2^(x + 2) + 3, which incorporates the shifts.