Graphing Exponential Equations Worksheet Answer Key PDF

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Part 1: Foundational Knowledge

What is the general form of an exponential equation?

undefined. A) y = mx + b

undefined. B) y = a * b^x ✓

undefined. C) y = ax^2 + bx + c

undefined. D) y = 1/x

The general form of an exponential equation is represented as y = a * b^x.

Which of the following are components of an exponential function? (Select all that apply)

undefined. A) Base b ✓

undefined. B) Coefficient a ✓

undefined. C) Exponent x ✓

undefined. D) Slope m

The components of an exponential function include the base, coefficient, and exponent.

Explain what happens to the graph of an exponential function when the base b is greater than 1.

When the base b is greater than 1, the graph of the exponential function increases rapidly as x increases.

Identify the effects of the following transformations on the graph of y = 2^x:

1. Vertical shift: y = 2^x + 3

The graph shifts up by 3 units.

2. Horizontal shift: y = 2^(x-2)

The graph shifts right by 2 units.

A vertical shift adds 3 to the function, moving it up, while a horizontal shift moves the graph to the right by 2 units.

Part 2: Comprehension

What is the y-intercept of the exponential function y = 3 * 2^x?

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

The y-intercept occurs when x = 0, which gives y = 3.

Which of the following graphs represent exponential decay? (Select all that apply)

undefined. A) y = 0.5^x ✓
undefined. B) y = 2^{-x} ✓
undefined. C) y = 3^x
undefined. D) y = 4^{0.5x}

Graphs that represent exponential decay will show a decrease in value as x increases.

Describe how the graph of y = 5 * (0.8)^x differs from the graph of y = 5 * (1.2)^x.

The graph of y = 5 * (0.8)^x shows exponential decay, while y = 5 * (1.2)^x shows exponential growth.

Part 3: Application and Analysis

If a population of bacteria doubles every hour, which equation models this growth if the initial population is 100?

undefined. A) y = 100 * 2^x ✓
undefined. B) y = 100 * x^2

undefined. C) y = 100 * 0.5^x
undefined. D) y = 100 + 2x

The correct model for the doubling population is y = 100 * 2^x.

Which transformations would you apply to the graph of y = 2^x to obtain y = -2^{(x+1)} + 3? (Select all that apply)

undefined. A) Reflect over the x-axis ✓
undefined. B) Shift left by 1 unit ✓
undefined. C) Shift up by 3 units ✓
undefined. D) Shift right by 1 unit

The transformations include reflecting over the x-axis, shifting left by 1 unit, and shifting up by 3 units.

Given the function y = 4 * 3^x, predict the value of y when x = 2 and explain your reasoning.

When x = 2, y = 4 * 3^2 = 36. This is calculated by evaluating the function at that point.

Which of the following statements best describes the asymptotic behavior of the graph y = 2^{-x}?

undefined. A) It approaches the y-axis.
undefined. B) It approaches the x-axis. ✓
undefined. C) It approaches a vertical line.
undefined. D) It approaches a horizontal line at y = 2.

The graph approaches the x-axis as x increases, indicating it has a horizontal asymptote at y = 0.

Analyze the graph of y = 3 * (0.5)^x. Which of the following are true? (Select all that apply)

undefined. A) The graph represents exponential growth.
undefined. B) The graph represents exponential decay. ✓
undefined. C) The y-intercept is 3. ✓
undefined. D) The graph has a horizontal asymptote at y = 0. ✓

The graph represents exponential decay, has a y-intercept of 3, and approaches a horizontal asymptote at y = 0.

Compare and contrast the graphs of y = 2^x and y = 2^{-x}. Discuss their key differences in terms of growth and decay.

The graph of y = 2^x shows exponential growth, while y = 2^{-x} shows exponential decay, with the former increasing and the latter decreasing.

Part 4: Evaluation and Creation

Which scenario is best modeled by an exponential decay function?

undefined. A) The height of a ball thrown into the air.

undefined. B) The cooling of a hot object over time. ✓

undefined. C) The growth of a tree over years.

undefined. D) The distance traveled by a car moving at constant speed.

The cooling of a hot object over time is best modeled by an exponential decay function.

Evaluate the function y = 5 * 2^x for x = -1, 0, 1. Which of the following are correct values? (Select all that apply)

undefined. A) y = 2.5 when x = -1 ✓

undefined. B) y = 5 when x = 0 ✓

undefined. C) y = 10 when x = 1 ✓

undefined. D) y = 20 when x = 2

The correct values are y = 2.5 when x = -1, y = 5 when x = 0, and y = 10 when x = 1.

Design a real-world problem that can be modeled using an exponential function. Describe the scenario, define the variables, and write the exponential equation that represents the situation.

An example could be modeling the population growth of a species, where the initial population and growth rate are defined.