

NAME: _____

P.I. A.A.9: Analyze and solve verbal problems that involve exponential growth and decay

P.I. A2.A.6: Solve an application which results in an exponential function

1. Describe one real-life model of a quantity that would increase exponentially and another real-life model of a quantity that would decrease exponentially.
2. What is true about the value of b when the function $y = a \cdot b^x$ models exponential growth? What happens to the y -values in exponential growth models?
3. The radioactivity of a substance has a half-life. This means that, after a period of time, the substance loses half of its radioactivity, and this pattern continues. Explain how this is an example of exponential decay.
4. What is true about the value of b when the function $y = a \cdot b^x$ models exponential decay? What happens to the y -values in exponential decay models?

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5. Give an example of a function that models exponential decay. Explain why your function models exponential decay.
6. Give a table of a set of data that can be modeled using an exponential function. Give the function modeled by the data.
7. Write the keystrokes you would use to evaluate the exponential expression $450 \cdot 1.2^5$.
8. Write a problem that involves calculating compound interest and uses any problem solving strategy. Include the solution.
9. Write a real-life problem that could be solved using the formula for interest compounded continuously, $A = Pe^{rt}$. Then solve it.

Answers may vary. Sample: money in an interest-bearing account increases exponentially; value of a car decreases exponentially.

[2] $b > 1$: The y -values increase because of repeated multiplication by a number greater than 1.

If the amount of radioactivity is represented by a and one half-life period is represented by x , then the amount of radioactivity left after x half-life periods is $a\left(\frac{1}{2}\right)^x$. This is a model for exponential decay

[3] since b in ab^x is between 0 and 1.

[4] $0 < b < 1$: The y -values decrease because of repeated multiplication by a number between 0 and 1.

Answers may vary. Sample: $y = 2 \cdot \left(\frac{1}{4}\right)^x$; The function models exponential decay because $0 < \frac{1}{4} < 1$.

Answers may vary. Sample:

x	1	2	3	4
y	1	9	27	81

[6] $y = 3^x$

[7] 450 \times 1.2 $^$ 5 ENTER

Answers may vary. Sample: Mary invests \$400 in an account paying 3.4% interest compounded annually. What will the account balance be after 5 years? \$472.78

Answers may vary. Sample: How many years will it take to double an investment of any amount at 6% interest compounded continuously? 11.6 years
