Algebra I Practice A.CED.A.1: Modeling Exponential Functions

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1. The amount of money *A* accrued at the end of *n* years when a certain amount *P* is invested at a compound annual rate *r* is given by $A = P(1+r)^n$. If a person invests \$150 at 5% interest compounded annually, find the approximate amount obtained at the end of 5 years.

   [A] \$191 [B] \$4500

   [C] \$1139 [D] \$900

2. The projected worth (in millions of dollars) of a large company is modeled by the equation $y = 246(1.11)^x$. The variable *x* represents the number of years since 1997. What is the projected annual percent of growth, and what should the company be worth in 2005?

   [A] 21%; \$273.06 million

   [B] 21%; \$629.28 million

   [C] 11%; \$566.92 million

   [D] 11%; \$510.74 million

3. You borrow \$200 from a relative for six months. You agree to pay compound interest at the rate of 1% per month. How much interest will you pay your relative when you return the money at the end of the six months?

   [A] \$11.66 [B] \$201.00

   [C] \$210.00 [D] \$12.30

4. Which of the following accounts will yield the greatest amount of interest on an initial deposit of \$500.00?

   [A] Account that pays 6% interest compounded annually for 3 years

   [B] Account that pays 4% interest compounded annually for 4 years

   [C] Account that pays 3% interest compounded annually for 5 years

   [D] Account that pays 5% interest compounded annually for 6 years

5. The population of Mexico in mid-1994 was 91,800,000. Its annual growth rate is 2.2%. Estimate its population in mid-2000.

6. Use any problem solving strategy to solve the following problem. The value of a house is expected to increase from its current value of \$50,000 by 3% each year. What will the value of the house be after 3 years? If you have \$55,000 in 3 years, will you have enough to buy the house?

7. A position at a local company has a starting salary of \$15,000. The salary is expected to increase by 5% each year. What will the salary be after 5 years?

8. Find the amount accumulated to the nearest cent on \$700 compounded annually for 3 years at 9%.

9. Suppose that in 1880, one of your ancestors invested $46 compounded annually at 6.5%. If this money were left to you, how much would you have had at the end of 1997? Round to the nearest dollar.

10. Sandra deposited $700 in an account paying 6.4% interest compounded annually. Find her account balance after 4 years.

11. This table shows information about the population of two countries in South America.

Country	**Population (est., mid-1994)**	**Annual Population Growth Rate**
Chile	14,000,000	1.7%
Ecuador	10,782,000	2.5%

Will the population of Ecuador surpass the population of Chile by mid-1999?

12. You decide to buy a boat that costs $8550. The normal depreciation for such a boat is 17% per year. If you pay for the boat with a 5 year loan, how much less will the boat be worth after you have paid off the loan?

[A] $8465.00 [B] $3367.88 [C] $5182.12 [D] $10195.4

13. Write and solve an exponential function to model the situation and find the population after the given time. Round to the nearest whole number. 2 million initial population; 4% annual decrease; 3 years

[A] $y = 2{,}000{,}000(0.96)^x$
1,769,472

[B] $y = 2{,}000{,}000(1.04)^x$
2,163,200

[C] $y = 2{,}000{,}000(0.96)^x$
1,843,200

[D] $y = 2{,}000{,}000(1.04)^x$
2,249,728

14. Write an exponential function to model the situation. Then predict the value of the function after 5 years (to the nearest whole number).
A population of 410 animals that decreases at an annual rate of 14%.

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[1] A

[2] C

[3] D

[4] D

[5] 104,600,000

[6] $54,636.35; yes

[7] $19,144.22

[8] $906.52

[9] $72,889

[10] $897.15

[11] no

[12] C

[13] A

[14] $f(x) = 410(0.86)^x$; 193