

Algebra 2CP

Problem Solving Using Logarithms

Show a complete calculator set-up for each of the following. Round all answers to the nearest cent, nearest year or nearest hour.

1. One thousand dollars is invested at 12% interest compounded annually. Determine how much the investment is worth after: a) 1 year b) 3 years
2. One thousand dollars is invested at 12% annual interest for three years. Determine how much the investment is worth if the interest is compounded: a) semi-annually b) quarterly c) daily
3. The value of a \$12,500 used car decreases 20% per year. Find its value after: a) 1 year b) 3 years
4. The value of a \$3500 sailboat depreciates 10% per year. Find its value after: a) 1 year b) 10 years
5. How long will it take you to double your money if you invest \$1000 at 8% compounded annually?
6. How long will it take you to triple your money if you invest \$4000 at 6% compounded annually?
7. A gold coin appreciated in value from \$100 to \$238 in eight years. Find the average annual rate of appreciation.
8. Ten years ago Michael paid \$250 for a rare 1823 stamp. Its current value is \$1000. Find the average annual rate of growth.
9. A used car valued at \$12,000 decreased in value to \$4900 in 5 years. Find the annual rate of depreciation.
10. A certain radioactive element decays over time according to the equation $y = A\left(\frac{1}{2}\right)^{\frac{t}{300}}$ where A= the number of grams present initially and t=time in years. If 1000 grams were present initially a) how many grams are present after 900 years? b) how long will it take for there to be 100 grams remaining?

11. Bacteria in a culture are growing exponentially with time according to the table shown.

Bacteria Growth

- a) Write an equation to model the number of bacteria present at any time t.
- b) How many bacteria are there after 8 hours?
- c) How long will it take for there to be 100,000 bacteria present?

Hour	Bacteria
0	60
1	120
2	240

ANSWERS: 1. a) \$1120 b) \$1404.93 2. a) \$1418.52 b) \$1425.76 c) \$1433.24 3. a) \$10,000 b) \$6400
4. a) \$3150 b) \$1220.37 5. 9.01 or 9 years 6. 18.9 or 19 years 7. 11.4% 8. 14.9% 9. 16.4%
10. a) 125 grams b) 996.6 or 997 years 11. a) $y = 60(2)^t$ b) 15,360 bacteria c) 10.7 or 11 hours

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