

Exponential Growth and Decay Homework

1) Given the equation $y = 35(0.57)^x$

- a) Does this equation represent growth or decay?
 b) What is the rate of growth or decay?
 c) What is the initial value?
 d) Evaluate for $x = 5$

$$\begin{array}{r} \text{decay} \\ \text{decay Rate} = .43 \text{ or } 43\% \\ \hline 35 \\ \hline 2.1059 \end{array}$$

2) Given the equation $y = 225(1.23)^x$

- a) Does this equation represent growth or decay?
 b) What is the rate of growth or decay?
 c) What is the initial value?
 d) Evaluate for $x = 2$

$$\begin{array}{r} \text{growth} \\ \text{growth Rate} = .23 \text{ or } 23\% \\ \hline 225 \\ \hline 340.4025 \end{array}$$

3) A used car was purchased for \$12,329 this year. Each year the car's value decreases 8.5%.

- a) Write an exponential equation describing this situation.

$$f(x) = 12,329(1 - 0.085)^x \quad \text{OR} \quad f(x) = 12,329(.915)^x$$

- b) What will the car be worth in 2020?

This year = 2016
 Year 2020 = 4 years

$$f(4) = 12,329(.915)^4 = 8,641.96$$

4) You have invested \$2,500 in stocks. The stock increases at a rate of 5% and is compounded monthly.

- a) Write a compound interest function to model the situation.

$$f(x) = 2500\left(1 + \frac{.05}{12}\right)^{12x}$$

- b) How much will the stocks be worth in 3 years?

$$f(3) = 2500\left(1 + \frac{.05}{12}\right)^{12(3)} = \$2903.68$$

5) Jeremiah owns a business. His first year he made \$11,212, each of the following years his profit increased 12%.

- a) Write an exponential equation describing the situation.

$$f(x) = 11,212(1.12)^x$$

- b) What will he make in 20 years?

$$f(20) = 11,212(1.12)^{20} = \$108,154.24$$

6) Dianna just bought a home. She paid \$240,000. She is able to pay 20% of the loan off each year.

- a) Write an exponential equation describing the situation.

$$f(x) = 240,000(.80)^x$$

- b) What will she owe in 10 years?

$$f(10) = \$25,769.80$$

7) A radioactive material decays at a rate of 40% per hour.

- a) If we start with 80 grams of the substance, can you find a formula that models this rate of decay?

$$f(x) = 80(.60)^x$$

- b) How much will be remaining at the end of 6 hours?

$$f(6) = 80(.60)^6 = 3.73 \text{ g}$$

- c) Will we have less than a gram before the end of the day? About how many hours does it take to decay to less than a gram?

Yes. You will have less than 1 gram after 9 hours.