

5.6H Growth and Decay

Name: _____ Per: _____

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Determine the common ratio (sometimes called the multiplier) for each growth or decay rate.

1. 5% growth
2. 12% decay
3. 98% decay
4. 1% decay
5. 300% growth
6. 0.85% growth

For the following, write an equation and then calculate the expected price in the year **2020** if you assume that there was a **3% increase inflation rate** and the given price is from **1998**.

7. Big Mac, \$1.85
 - a. Equation: _____
 - b. Expected price: _____
8. Movie Admission, \$5.00
 - a. Equation: _____
 - b. Expected price: _____
9. Monthly rent, \$400
 - a. Equation: _____
 - b. Expected price: _____
10. Small Car, \$6,000
 - a. Equation: _____
 - b. Expected price: _____

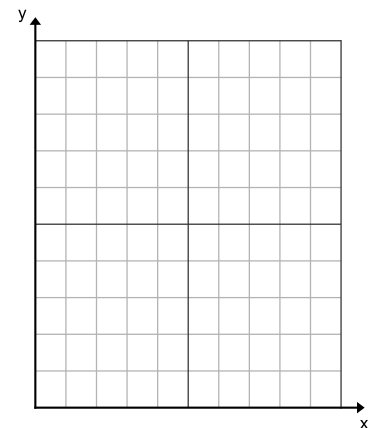
Answer the following.

11. $f(x) = 3(0.75)^x$
 CIRCLE: Growth OR Decay
 Initial amount or $f(0)$ _____
 Multiplier (or r) _____
 Find $f(3) =$ _____
 What is the percent of growth/decay _____
12. $f(x) = 1.5(1.01)^x$
 CIRCLE: Growth OR Decay
 Initial amount _____
 Multiplier _____
 Find $f(1) =$ _____
 What's the percent of growth/decay _____

13. You buy a new computer for \$2,100 and you used your Amazon credit card at 24% compound annual interest.

- a. CIRCLE: Growth OR Decay
- b. What is the initial amount _____
- c. What is the multiplier (common ratio) _____
- d. Make a table for years 1 – 4, then plot the points on the graph.

- e. Write an explicit equation for t years. _____
- f. What is the cost of the loan after 14 years? _____



14. In 2015 Mason's mom bought him an iPhone 6s for \$599. Now it's been five years and Mason's phone is seriously out of date. Mason decides to sell the phone on KSL and needs to figure out a fair price so he assumes it depreciated at a rate of 16.5% per year.

- a. Write an explicit equation to calculate the worth of his phone. _____
- b. What is his phone worth today (2020)? _____
- c. How much will the phone be worth in 2022 if Mason keeps the phone? _____

Solve the following problems.

15. E. coli bacteria double in population every thirty minutes. The initial population is 85.
- a. Write an Explicit Eq: _____
 - b. Write a Recursive Eq: _____
 - c. What is the population of bacteria after three hours? _____ After one day? _____
16. You decide to deposit \$5,000 at 24% compound interest per year.
- a. Write an Explicit Eq: _____
 - b. Write a Recursive Eq: _____
 - c. How much will you have after one year? _____ Three years? _____
17. The population of Bloom Falls, Mass. (population 937) is slowly increasing by 4.5% each year.
- a. Write an Explicit Eq: _____
 - b. Write a Recursive Eq: _____
 - c. What is the population after 3 years? _____
18. You bought a Boston Whaler in 2004 for \$12,500. The boat's value depreciates by 7% a year.
- a. Write an Explicit Eq: _____
 - b. Write a Recursive Eq: _____
 - c. How much is the boat worth now (2020)? _____
 - d. What will it be worth in 2025? _____
19. The sloth is trying to get to fruit that is 20 feet away. Each day the sloth gets 50% closer to the fruit.
- a. Write an Explicit Eq: _____
 - b. Write a Recursive Eq: _____
 - c. How close will the sloth be in 3 days? _____
 - d. How many days until the sloth arrives at the fruit? _____
- Explain: _____

Many types of items **depreciate** in value with time like the value of your car or the value of the phone in your pocket. If you purchased the following items in **2012** for the price listed below and **assuming 7% depreciation per year**. Answer the following.

- | | |
|---|----------------------------------|
| 20. Cell phone: \$550.00 | 21. Used car: \$8000.00 |
| a. Recursive Equation: _____ | a. Recursive Equation: _____ |
| b. Explicit Equation: _____ | b. Explicit Equation: _____ |
| c. Value of phone this year: _____ | c. Value of car this year: _____ |
| d. When will the phone be worth \$0 _____ | |
| Explain: _____ | |

Given the same circumstances as above, answer the following if they depreciated by **11.5% per year**.

- | | |
|---|---|
| 22. Cell phone: \$550.00 | 23. Used car, \$8000.00 |
| a. Explicit Equation: _____ | a. Explicit Equation: _____ |
| b. How much would the phone be worth today? _____ | b. How much would the car be worth today? _____ |