**Review:**

1. Given the table below, determine which functions (if any) are linear and which are exponential. Justify your answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **t** | **f(t)** | **g(t)** | **h(t)** |
| -2 | 95 | 810 | 100 |
| -1 | 92.5 | 270 | 120 |
| 0 | 90 | 90 | 144 |
| 1 | 87.5 | 30 | 172.8 |

f(t) is \_\_\_\_\_\_\_\_\_\_\_\_ because it has a constant \_\_\_\_\_\_\_\_of \_\_\_\_.

g(t) is \_\_\_\_\_\_\_\_\_\_\_\_ because it has a constant \_\_\_\_\_\_\_\_ of \_\_\_\_.

h(t) is \_\_\_\_\_\_\_\_\_\_\_\_ because it has a constant \_\_\_\_\_\_\_\_ of \_\_\_\_.

1. Write the equation for all linear and exponential functions found above.
2. You have just been hired at a new job with a starting salary of $35,000. Your boss has guaranteed you a yearly salary increase of 4%. Fill in the following table.

|  |  |
| --- | --- |
| t, time in years | S, Salary in dollars |
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |

* 1. Would linear or exponential growth better model the relationship above? Explain.
  2. Write an equation *using function notation*for the scenario above.
  3. A growth **rate** of **4%** corresponds to a growth **factor** of **\_\_\_\_\_\_\_\_.**
  4. In general, how do you determine the growth factor when given a growth rate as a percent?

1. The equation determined last class to model the cost of a Vail lift ticket in dollars, *C*, as a function of the time in years after 1962, *t*, is given below.



1. Does this exponential function represent growth or decay? Explain.
2. Determine the value of the rate.
3. In general, how do you determine the growth rate when given a growth factor?
4. Interpret the value of the rate within the context of the situation.
5. Complete the following statements
   1. A growth rate of 6.7% corresponds to a growth factor of \_\_\_\_\_\_\_\_\_.
   2. A growth factor of 1.22 corresponds to a growth rate of \_\_\_\_\_\_%

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1. As a retail manager, you have decided to discount a $1000 TV on clearance by 10% a month until your inventory is completely gone. Fill in the following table.

|  |  |
| --- | --- |
| N, Number of Months | P, Price in dollars |
| 0 |  |
| 1 |  |
| 2 |  |
| 3 |  |

1. Would linear or exponential decay better model the relationship above? Explain.
2. Write an equation *using function notation*for the scenario above.
3. A decay **rate** of **10%** corresponds to a decay **factor** of \_\_\_\_\_\_\_\_.
4. In general, how do you determine the decay factor when given a decay rate as a percent?
5. The equation determined last class to model the concentration in mg/L of an asthma drug, *T*, as a function of the time in hours, *h*, is given below.



1. Does this exponential function represent growth or decay? Explain.
2. Determine the value of the rate.
3. In general, how do you determine the decay rate when given a decay factor?
4. Interpret the value of the rate within the context of the situation.
5. Complete the following statements
   1. A decay rate of 12.3% corresponds to a decay factor of \_\_\_\_\_\_\_.
   2. A decay factor of 0.972 corresponds to a decay rate of \_\_\_\_\_\_\_%.

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1. The initial population of both town A, ***PA***, and of town B, ***PB***, was 100 people. Let ***t*** represent the time in years. Write an equation to represent the population of
2. Town A if its population is growing by 20% each year.
3. Town B if its population is decreasing by 20% each year.
4. Fill in the table below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Exponential function | Initial value | Growth or decay? | Growth or decay factor? | Growth or decay rate  (as %) |
|  |  |  |  |  |
|  |  |  |  |  |
|  | 1000 |  | 1.005 |  |
|  | 30 |  | 0.96 |  |
|  | 50,000 | Growth |  | 7.05% |
|  | 200 | Decay |  | 49% |

1. A quantity, *Q*, increased from 30 mg to 32.7 mg after four hours, *h*.
2. Construct an exponential function that models the situation using the given variables. Round to 3 decimal places. Show all work.
3. Does the factor determined in part a represent growth or decay? Is this consistent with the information given in the question?
4. Determine the value of the rate AND interpret it within the context of the situation.
5. The earth’s atmospheric pressure is a function of the height above sea level. The pressure at sea level (height = 0) is 1013 millibars and the pressure decreases by 14% for every kilometer above sea level.
6. Would a linear or exponential function better model this situation? Explain.
7. Model the function *using function notation* with *P* as the pressure in millibars and *h* as the height above sea level in km.
8. What is the atmospheric pressure at 50 km? Round to three decimal places.