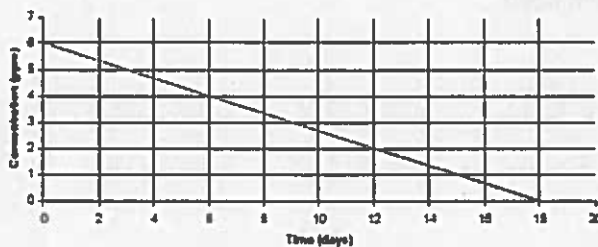


[REDACTED]

Name _____ Date _____

PART 1:

For questions 1 through 6, use the graph shown, which shows the concentration of a substance, in parts per million (ppm), as a function of time, in days.



- What is the concentration on day 12?
(a) 0.5 ppm (b) 2 ppm (c) 3.5 ppm (d) 5 ppm
- What is the rate of change?
(a) $-\frac{1}{4}$ ppm per day (b) $\frac{1}{6}$ ppm per day (c) $-\frac{1}{3}$ ppm per day (d) $\frac{1}{5}$ ppm per day
- By how much does the concentration drop over the space of 3 days?
(a) 0.5 ppm (b) 1 ppm (c) 2 ppm (d) 2.5 ppm
- Find the initial value of the concentration.
(a) 6 ppm (b) 7.5 ppm (c) 8.5 ppm (d) 10 ppm
- Which is an equation representing concentration, c , as a function of time, t ?
(a) $c = 8 - \frac{1}{4}t$ (b) $c = 6 - \frac{1}{3}t$ (c) $c = 5 + \frac{1}{5}t$ (d) $c = 3 + \frac{1}{6}t$
- Use the equation to predict the concentration on day 18.
(a) 0 ppm (b) 1.5 ppm (c) 2 ppm (d) 2.5 ppm

PART 2:

1. A company hopes to hire 25 new employees each year. If the company employs 430 people today, how many do they hope to employ in 5 years?

2. The value of farm equipment depreciates by 18% each year. If a piece of equipment cost \$1200 new six years ago, how much is that equipment worth now?

3. The number of traffic fatalities due to alcohol in a particular town has dropped by 45 every year. If there were 205 traffic fatalities due to alcohol 3 years ago, how many are expected this year?

4. Suppose the population of a country changes due to births, deaths, and immigration. The annual birth rate is 3.5 births per 1000 people, the death rate is 7.2 deaths per 1000 people, the immigration rate into the country is 9.3 per 1000, and the emigration rate out of the country is 4.6 per 1000. Find the net growth rate as a percentage.

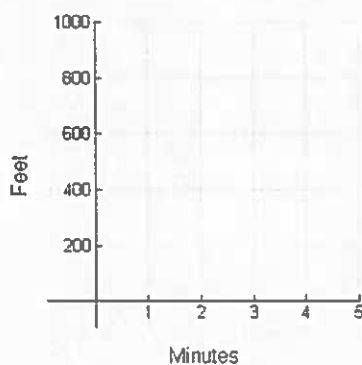
Hot Air Balloon
MATH 109 Linear Modeling

First & Last Name _____

A person lowers his hot-air balloon by gradually releasing air from it. Let t be the number of minutes that he has been releasing air from the balloon, and let h be the height of the balloon (in feet). Assume that the relationship between t and h is described by the equation $h = -200t + 800$.

- a) Complete the table of values and sketch the graph by plotting the ordered pairs. b) Find the h -intercept (ordered pair). Write the meaning of the h -intercept in a complete sentence using correct units. c) Find the t -intercept (ordered pair). Write the meaning of the t -intercept in a complete sentence using correct units. d) What is the slope of the model? Write the meaning of the slope in a complete sentence using correct units.

t	h
0	
1	
2	
3	
4	
5	



Exponential Functions

$$y = f(x) = a \cdot b^x$$

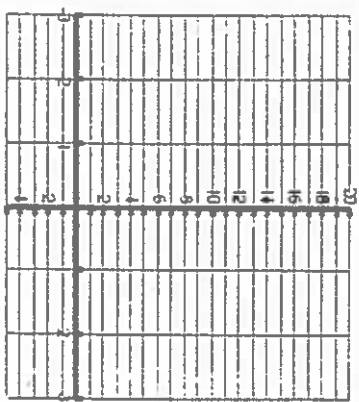
$$y = f(x) = 2 \cdot 3^x$$

Important constants: $a = \dots\dots\dots, b = \dots\dots\dots$

x	$y = f(x) = 2 \cdot 3^x$
-1	
0	
1	
2	
3	
4	

Describe the pattern in x and y:

The y-intercept is



Domain =

Range =

Exponential Functions

$$y = f(x) = a \cdot b^x$$

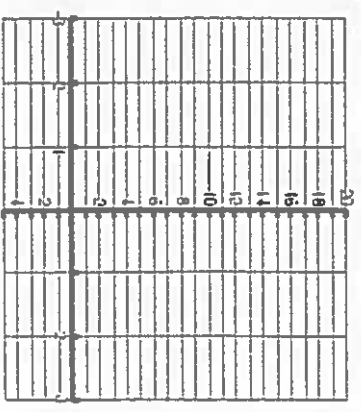
$$y = f(x) = 8 \cdot (1/2)^x$$

Important constants: $a = 8$; $b = 1/2$

x	$y = f(x) = 8 \cdot (1/2)^x$
-1	
0	
1	
2	
3	
4	

Describe the pattern in x and y:

The y-intercept is



Domain =

Range =