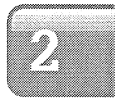


Name _____ Date _____

Choose Wisely!

Understanding Non-Linear Graphs and Inequalities



1. A scientist is researching certain bacteria that have been found recently in the large animal cages at a local zoo. He starts with 200 bacteria that he intends to grow and study. He determines that every hour the number of bacteria increases by 25%.

This problem situation is represented by one of the following functions:

$f(t) = t^2 + 1.25t + 200$	$f(t) = 1.25t + 200 $
$f(t) = 200(1.25)t$	$f(t) = 1.25t + 200$

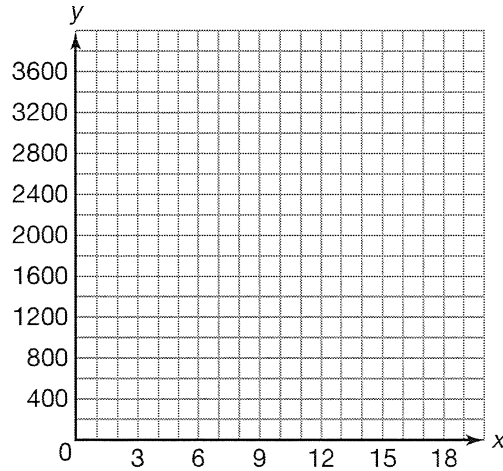
- a. Which function represents this problem situation? Explain your reasoning.

- b. Complete the table to represent the amount of bacteria as a function of the number of hours it is in the growth medium.

	Independent Quantity	Dependent Quantity
Quantity		
Units		
	0	
	2.5	
	5	
	8	
	9.5	
	12	
	12.5	
	t	

- c. Use the data collected in the table to create a graph of the situation, then estimate the number of hours the scientist should let the bacteria grow to have no more than 2000 bacteria.

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- d. Determine the exact number of hours the bacteria can grow but not exceed 2000. Explain your method. Write your answer as an inequality.

Name _____ Date _____

2. The cost per family to join the Grove Heights swimming pool is \$375. In order to get the pool ready for the summer, renovation and painting are needed each spring. The pool asks the members to help complete the work. For every hour a family member works during the spring, the pool will reduce the membership fee by \$10.



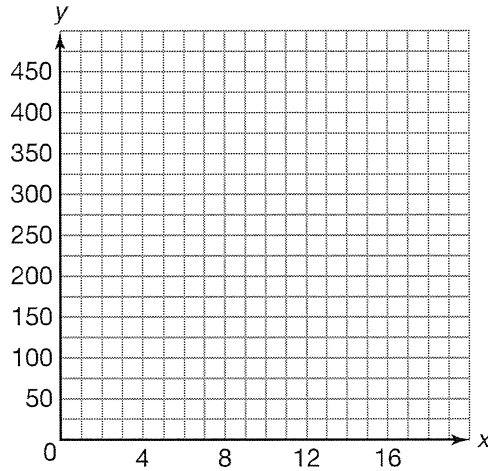
This problem situation is represented by one of the following functions:

$f(t) = 375 - 10t$	$f(t) = -10t + 375 $
$f(t) = -10t^2 + 10t + 37$	$f(t) = 375(10)t$

- a. Which function represents this problem situation? Explain your reasoning.
- b. Complete the table to represent the total membership fee as a function of the number of hours worked.

	Independent Quantity	Dependent Quantity
Quantity		
Units		
	0	
	2.5	
		305
		270
	13	
	t	

c. Use the data collected in the table to create a graph of the situation.



d. The membership fee was \$280 for a particular family. Use the graph to estimate the number of hours worked.

e. Use an algebraic method to determine the exact number of hours worked.

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