

Answers

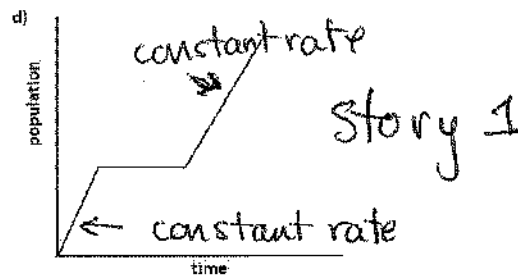
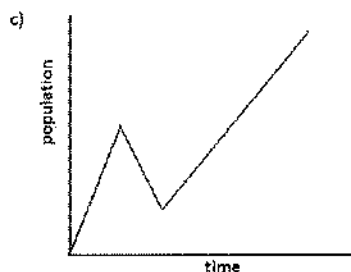
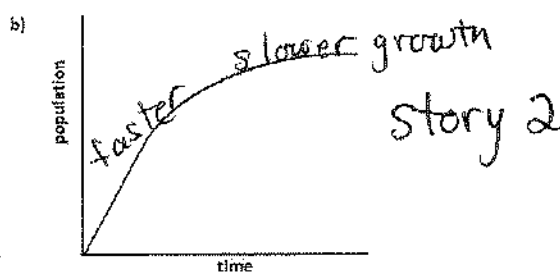
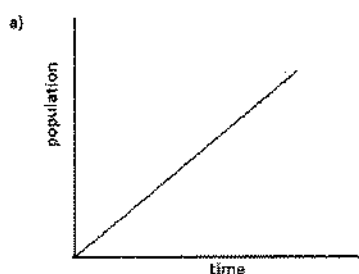
Problem Set

1. Below are three stories about the population of a city over a period of time and four population-versus-time graphs. Two of the stories each correspond to a graph. Match the two graphs and the two stories. Write stories for the other two graphs, and draw a graph that matches the third story.

Story 1: The population size grows at a constant rate for some time, then doesn't change for a while, and then grows at a constant rate once again. *graph d*

Story 2: The population size grows somewhat fast at first, and then the rate of growth slows. *graph b*

Story 3: The population size declines to zero. *none*



2. In the video, the narrator says:

"Just one bacterium, dividing every 20 minutes, could produce nearly 5,000 billion billion bacteria in one day. That is 5,000,000,000,000,000,000,000,000 bacteria."

This seems WAY too big. Could this be correct, or did she make a mistake? (Feel free to experiment with numbers using a calculator.)

3. *Bacillus cereus* is a soil-dwelling bacterium that sometimes causes food poisoning. Each cell divides to form two new cells every 30 minutes. If a culture starts out with exactly 100 bacterial cells, how many bacteria will be present after 3 hours?

6,400
bacteria

# min	# bacteria
0	100
30	200
60	400
90	800
120	1600
150	3200
180	6400

1 hr →
2 hrs →
3 hrs →



COMMON
CORE

Lesson 3:
Date:

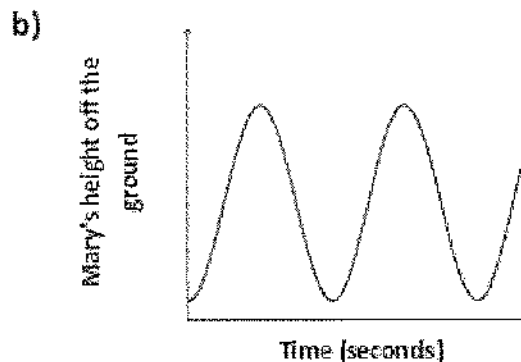
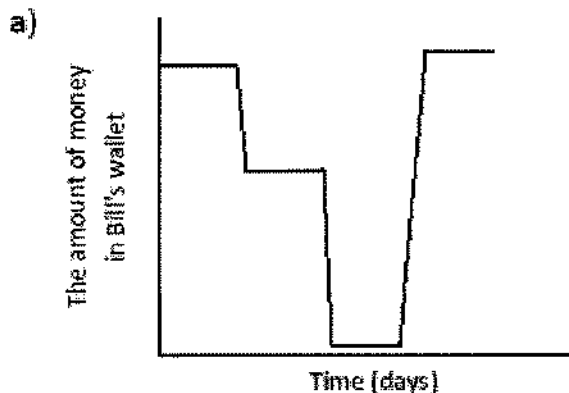
Graphs of Exponential Functions
8/7/13

engage^{ny}

5.13

4. Create a story to match each graph below:

Stories will vary.



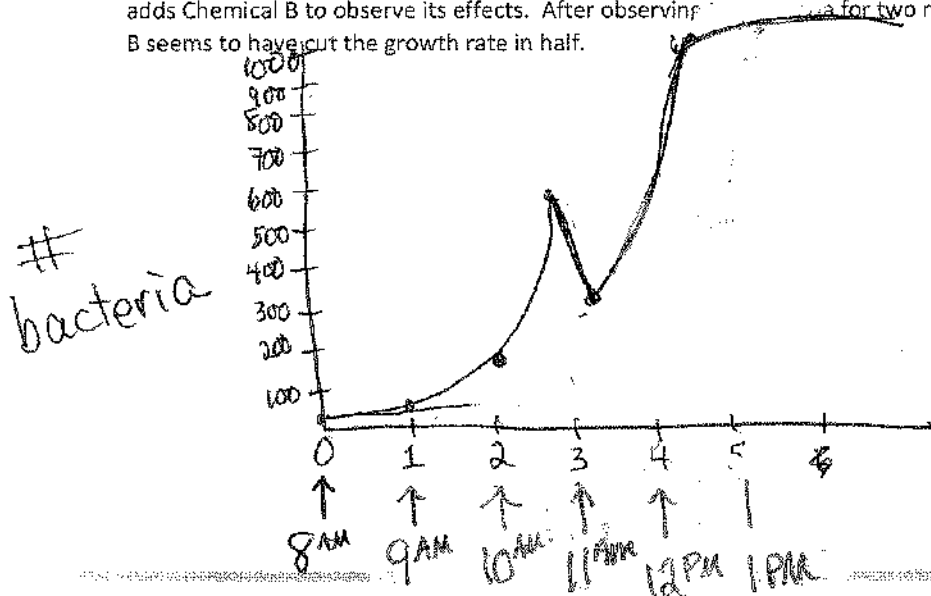
Mary jumped up & down on a mini trampoline.

5. Consider the following story about skydiving:

Julie gets into an airplane and waits on the tarmac for 2 minutes before it takes off. The airplane climbs to 10,000 feet over the next 15 minutes. After 2 minutes at that constant elevation, Julie jumps and free falls for 45 seconds until she reaches a height of 5,000 feet. Deploying her chute, she slowly glides back to Earth over the next 7 minutes where she lands gently on the ground.

- Draw an elevation versus time graph to represent Julie's elevation with respect to time.
- According to your graph, describe the manner in which the plane climbed to its elevation of 10,000 feet.
- What assumption(s) did you make about falling after she opened the parachute?

6. Draw a graph of number of bacteria versus time for the following story: Dave is doing an experiment with a type of bacteria that he assumes divides exactly every 30 minutes. He begins at 8:00 a.m. with 10 bacteria in a Petri dish and waits for 3 hours. At 11:00 a.m., he decides this is too large to handle and adds Chemical A to the dish, which kills half of the bacteria almost immediately. The remaining bacteria continue to grow in the same way. At noon, he adds Chemical B to observe its effects. After observing the bacteria for two more hours, he observes that Chemical B seems to have cut the growth rate in half.



time	# bacteria
8 ⁰⁰	10
8 ³⁰	20
9 ⁰⁰	40
9 ³⁰	80
10 ⁰⁰	160
10 ³⁰	320
11 ⁰⁰	640 then 320
11 ³⁰	640
12 ⁰⁰	1280