

Algebra 2 Handout on Linear and Exponential Growth
(Section 8.1 in textbook)

May 5, 2009

After you graduate from college you get offered a job as a junior executive at Acme Materials Company. They are a major supplier of things such as dynamite, sledge hammers, and rockets. Your initial hourly pay rate is \$30 and they gave you two different options for what your raises will be. The raises will be given each year right before the end of the year.

Option #1: Each year you get a \$10 raise in your hourly pay.

Option #2: Each year you get a 20% raise in your hourly pay (from its current level).

Questions

1. Who do you think Acme's largest client is?
2. Before filling in the table below, which option of raises do you think is a better deal, and why?
3. Fill in the table of values below for what your hourly pay is at the end of each year.

Year	Option 1	Option 2
0	30	30
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

4. Plot these points on graph paper. Your x-axis should be the year (zero is now, one is the end of your first year, etc.) and the y-axis should be your hourly pay. You should plot both data series on the same graph. **Make your graph big—a whole piece of paper.** Choose your scale carefully.

5. Try to write an equation describing the pay (y) as a function of year (x) for each of the two pay options.

Homework for Next Class

1. Complete the in-class assignment.
2. For each of the functions below, make a table of values, plot the points, and sketch the graphs on the other sheet provided. You should use the following x-values: -3, -2, -1, 0, 1, 2, 3. Be sure make your full table of values before graphing so you can set your y-scale appropriately.
 - a. $f(x) = 2^x$
 - b. $f(x) = 3^x$
 - c. $f(x) = 2^x + 3$
 - d. $f(x) = -2 \cdot 3^x$ (Note: is this the same as -6^x ??? Why or why not?)
 - e. $f(x) = \left(\frac{1}{2}\right)^x$
3. What are the domain and range of each of the functions above?
4. Describe the end behavior of these exponential functions, using words and/or the notation we used for end behavior in chapter 6 if possible.
5. Jim thinks of himself as a good investor. He bought one share of stock for \$100. The first year it lost 40% of its start-of-year value. The next year it gained 40% of its start-of-year value. Does this mean Jim ended with his \$100 again? Do the calculations and explain your results.
6. You start 100 feet away from a wall and every minute, you move halfway to the wall. Fill in the table below. Graph it and try to write an equation for distance (output) as a function of time (input). (If you get it right, for any time x , $f(x)$ should be the corresponding distance.) At this rate, will you ever hit the wall? For amusement, look up “Zeno’s Paradox.”

Time	Distance
0	100
1	50
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	