



Linear vs. Exponential Functions (Day 6–2)

1. Two equipment rental companies have penalty policies for returning their equipment late:

Company 1: On day 1, the penalty is \$5. On day 2, the penalty is \$10. On day 3, the penalty is \$15 and so on, increasing by \$5 each day the equipment is late.

Company 2: On day 1, the penalty is \$0.01. On day 2, the penalty is \$0.02. On day 3, the penalty is \$0.04 and so on, doubling in amount each additional day late.

Jim rented a digger from Company 2 because he thought it had the better late return policy. The job he was doing with the digger took longer than he expected, but it did not concern him because the late penalty seemed so reasonable. When he returned the digger 15 days late, he was shocked by the penalty fee.

a) What did Jim pay to Company 2?

Company 1	
Day	Penalty
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Company 2	
Day	Penalty
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

b) What would Jim have paid to Company 1?

c) What type of function does the fees for Company 1 represent and why?

d) What type of function does the fees for Company 2 represent and why?



2. A typical thickness of toilet paper is 0.001 inches. Seems pretty thin, right? Let's see what happens when we start folding toilet paper.

- a) How thick is the stack of toilet paper after 1 fold?
After 2 folds?
After 5 folds?

b) Write a formula for the function that models the thickness of the folded toilet paper after "x" folds.

c) The top of a building is 2500 feet high. If we fold the toilet paper 25 times, will it reach to the top of the building?

FORM OF EXPONENTIAL FUNCTIONS: $y = ab^x$ **OR** $f(x) = ab^x$

- "a" is the _____ value, population, number, etc. It is the number that you are starting with.
- "b" is the growth/decay _____. If b is greater than 1, it is a _____.
If b is less than 1, it is a _____.
- "x" is usually refers to _____, unless otherwise stated.

3. A tennis tournament has 128 competitors. Half of the competitors are eliminated each round. Write a function to represent the number of competitors that will be left after "x" rounds. Then determine how many players will be left after 5 rounds.



Classwork 6-2

1. Kyla is given two options for how she is to be paid at her job. Option A is to be paid \$1000 at the end of each month. Option B is to be given \$5 to start the year, and then get paid \$10 at the end of the first month, \$20 the second month, \$40 the third, doubling the amount she receives each month.
 - a) Write a function that can represent the amount that Kyla would be paid in any month with Option A.
 - b) Write a function that can represent the amount the Kyla would be paid in any month with Option B.
 - c) How much would Kyla get paid during the 8th month using option B?
 - d) Which option would you rather have? Justify your answer.

For questions #2 – 5:

- a) State whether the function is a growth or decay **and why**.
- b) State the initial value.

2. $c(t) = 100(.75)^t$

3. $p(n) = 40(1.80)^n$

4. $f(x) = 10,000(1.02)^x$

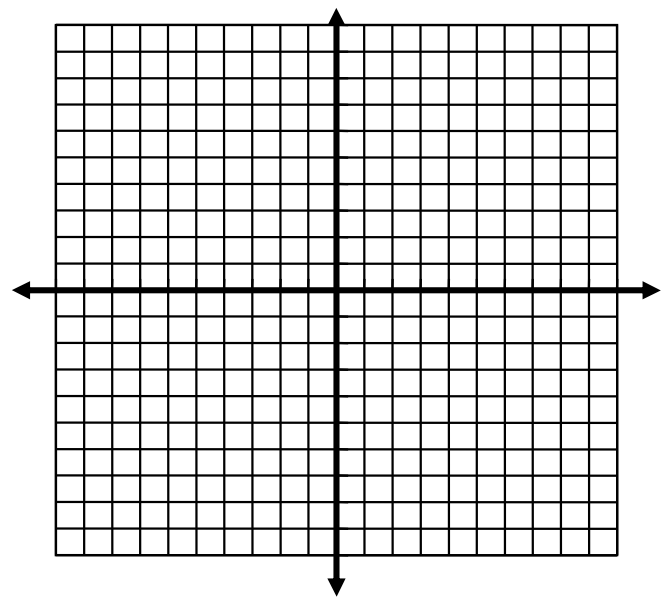
5. $f(n) = 50(.1)^n$



6. There are 500 rabbits in Lancaster on February 1st. If the amount of rabbits triples every month, write a function that represents the number of rabbits in Lancaster after “m” months.

How many rabbits are there in Lancaster on August 1st?

7. Graph the function $f(x) = \left(\frac{1}{2}\right)^x - 6$.



8. Graph the following inequality:

$$-4y - 16 > 2x$$

