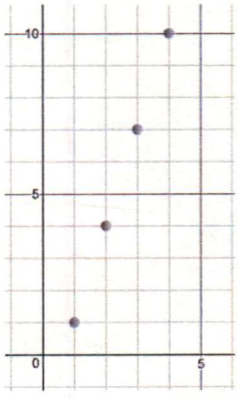
AGS 1 Name: _____ Period: _____ Date: _____

Unit 2.1 – Linear & Exponential Functions

Warmup – Create a table and then write the explicit equation for each given graph.

a)

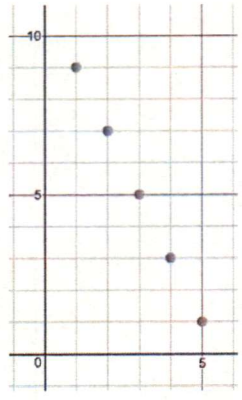


x	y
1	1
2	4
3	7
4	10

$f(x) = 1 + 3(x-1)$

Explicit Equation: $f(x) = 3x - 2$

b)

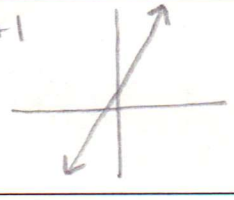
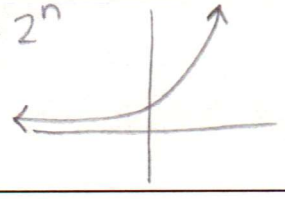


x	y
1	9
2	7
3	5
4	3
5	1

$f(x) = 9 - 2(x-1)$

Explicit Equation: $f(x) = -2x + 11$

Lesson

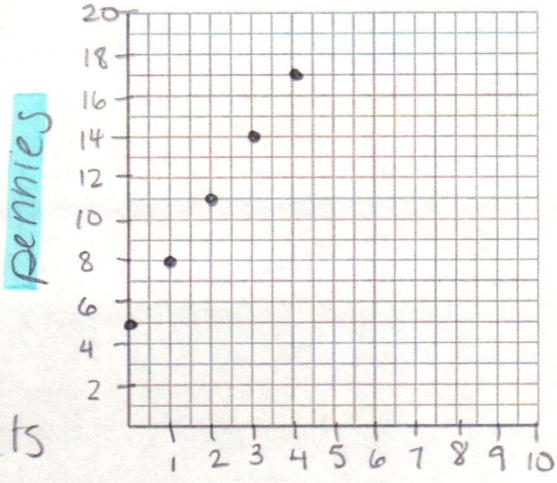
Word	Meaning/Notation	Example
discrete	Data that is separate and distinct	when a bus comes to a certain bus stop
continuous	Data that never stops changing	water flowing through Bonneville Dam
linear	an equation that makes a a graph of a straight line	$f(n) = 2n+1$ 
exponential	an equation that makes a graph that grows/decays faster & faster	$f(n) = 2^n$ 

For each given scenario, model using a table, graph, and equation.

1. Your three year old cousin, Leyla, wants to fill her piggy bank. She started with five pennies. You told her that you would give her the three pennies you have left over from buying lunch. Create a model that shows how many pennies she has on day *n*.

n	Days	0	1	2	3	4
	pennies	5	8	11	14	17

Connect the dots? no



Explicit Equation:

$f(n) = 3n + 5$

Type of graph: linear

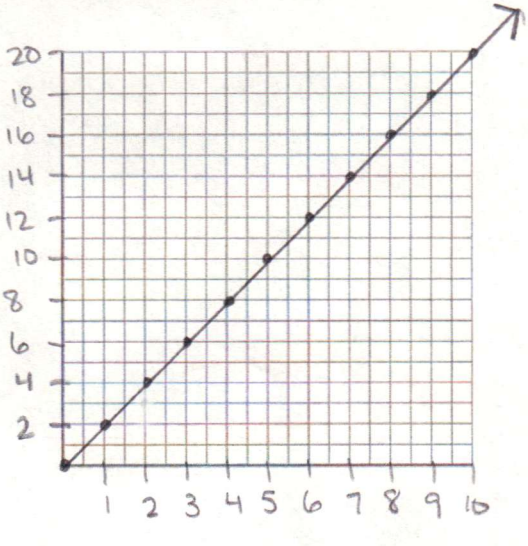
Discrete or continuous, why?

Discrete, because she only gets pennies once a day not throughout the day.

2. Last summer your family got a pool that holds 1500 gallons of water. You were put in charge of filling the pool. You decided that you didn't want to sit and watch it fill, however you needed to be able to figure out when to turn the water off. You were able to figure out that the hose would fill the pool at a rate of two gallons a minute. Create a model that shows how many gallons of water were in the pool at *t* minutes.

t	minutes	0	1	2	3	4
	gallons	0	2	4	6	8

Connect the dots? yes



Explicit Equation:

$f(t) = 2t + 0$

Type of graph: linear

Discrete or continuous, why?

Continuous, because the water is constantly flowing into the pool.

100% + 3% = 103% ← new balance

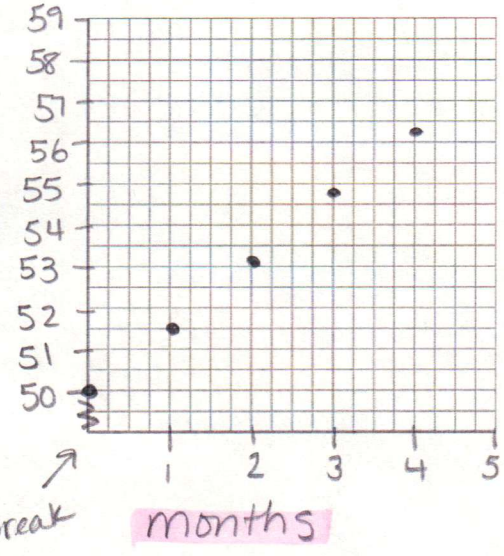
3. You were given $50 for your birthday and decide to put in a saving account that pays 3% a month. At the end of each month the interest is calculated, however if you take your money out before the end of the month you don't get any interest. Create a model that shows the balance in your account at the end of *m* months.

Looks linear because the growth is small in the beginning.

m

months	0	1	2	3	4
$	50	51.5	53.05	54.64	56.28

Connect the dots? no



Explicit Equation:

$$f(m) = 50(1.03)^m$$

Type of graph: exponential

Discrete or continuous, why?

Discrete, because money is only added at the end of the first month.

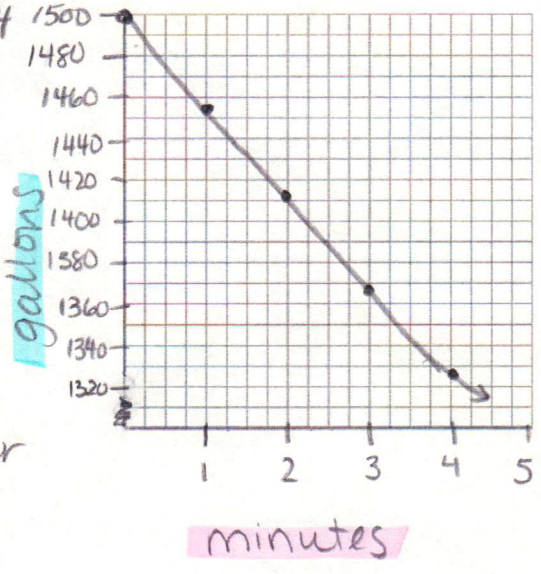
100% − 3% = 97% gallons left

4. At the end of summer, it was time to drain the pool. In the pool maintenance guide, it says the pool drains at a rate of 3% a minute. Once the pool is drained, your parents said you could leave for the movies. You need to let your friend know when you will be able to meet. Create a model that shows how many gallons of water were left in the pool at *t* minutes.

t

minutes	0	1	2	3	4
gallons	1500	1455	1411.35	1369.01	1327.94

Connect the dots?



Explicit Equation:

$$f(t) = 1500(.97)^t$$

Type of graph: exponential

Discrete or continuous, why?

Continuous, because the water is draining constantly.