Lesson 1.5 Notes

> Hi! My name is Bill Weights, founder of Super Scooper Ice Cream. I am offering you a gift certificate for our signature "Super Bowl" (a $4.95 value) if you forward this letter to 10 people.
>
> When you have finished sending this letter to 10 people, a screen will come up. It will be your Super Bowl gift certificate. Print that screen out and bring it to your local Super Scooper Ice Cream store. The server will bring you the most wonderful ice cream creation in the world—a Super Bowl with three yummy ice cream flavors and three toppings!
>
> This is a sales promotion to get our name out to young people around the country. We believe this project can be a success, but only with your help. Thank you for your support.
>
> Sincerely,
>
> Bill Weights
> Founder of Super Scooper Ice Cream

These chain emails rely on each person that receives the email to forward it on. Have you ever wondered how many people might receive the email if the chain remains unbroken? To figure this out, assume that it takes a day for he email to be opened, forwarded, and then received by the net person. On day 1, Bill Weghts starts by sending the email out to his 8 closest friends. They each forward it to 10 people so that on day 2 it is received by 80 people. The chain continues unbroken.

Describe the pattern.	How many people will receive the email on day 7?	Recursive rule:	Explicit rule:
Each day the number of people who receive the email multiplies by ten.	8,000,000	$f(0) = 0.8$ Remember that this is a theoretical number. It doesn't make sense, but it doesn't have to. $f(x) = f(x-1) \cdot 10$	$f(x) = 10^x \cdot 0.8$

If Bill gives away a Super Bowl that costs $4.95 to every person that receives the email during the first week, how much will he have spent?

$8 + 80 + 800 + 8{,}000 + 80{,}000 + 800{,}000 + 8{,}000{,}000 = 8{,}888{,}888 \quad 8{,}888{,}888 \cdot 4.95 = \$43{,}999{,}995.60$

Other important notes from today:

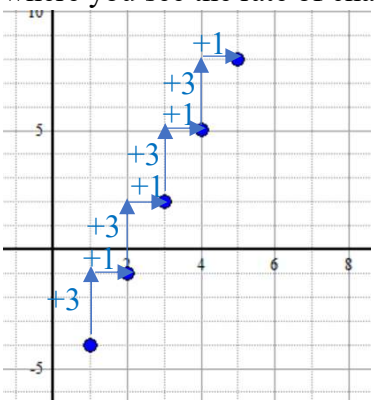
Arithmetic sequences are sequences that have repeated addition as the pattern. (Remember that subtraction is just adding a negative.)

Geometric sequences are sequences that have repeated multiplication as the pattern. (Remember that division is just multiplication by a fraction.)

$\div 2 = \cdot \frac{1}{2}$ $\div 3 = \cdot \frac{1}{3}$ $\div 4 = \cdot \frac{1}{4}$ $\div 5 = \cdot \frac{1}{5}$ $\div 6 = \cdot \frac{1}{6}$ etc.

The same sequence is shown in both a table and a graph. Indicate on the table where you see the rate of change of the sequence. Then draw on the graph where you see the rate of change.

	n	$f(n)$	
	1	-4	
+1	2	-1	+3
+1	3	2	+3
+1	4	5	+3
+1	5	8	+3



Write a recursive and explicit function for the ***geometric*** sequence. Graph each sequence and label your axes.

1. 6, 12, 24, 48, ...

   We are multiplying by two.

   Recursive Rule:

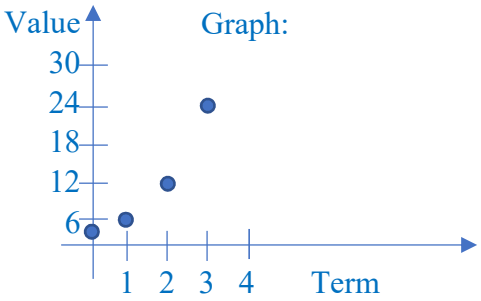
   $f(0) = 3$

   $f(x) = f(x-1) \cdot 2$

   Explicit Rule:

   $f(x) = 2^x \cdot 3$

   Graph:



2. Danny has $800 in an account. He decides he is going to take out a quarter of what is in there every month.

   We are dividing by four or $\cdot \frac{1}{4}$.

   Recursive Rule:

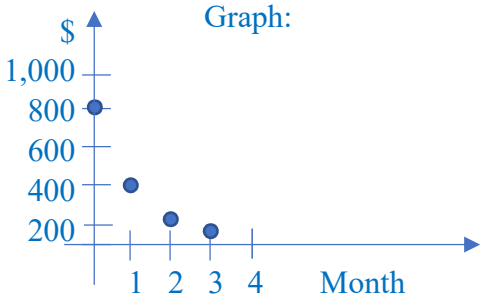
   $f(0) = 800$

   $f(x) = f(x-1) \cdot \frac{1}{4}$

   Explicit Rule:

   $f(x) = \left(\frac{1}{4}\right)^x \cdot 800$

   Graph:



Write a recursive and explicit function for the ***arithmetic*** sequence. Graph each sequence and label your axes.

1. 6, 12, 18, 24, ...

   We are adding six.

   Recursive Rule:

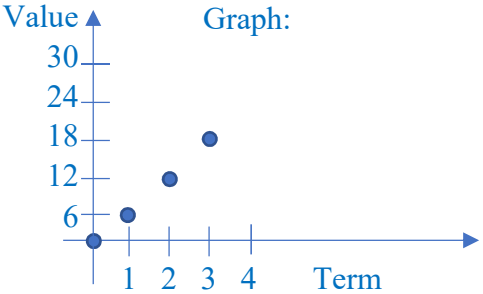
   $f(0) = 0$

   $f(x) = f(x-1) + 6$

   Explicit Rule:

   $f(x) = 6x$

   Graph:



2. Danny has $800 in an account. He decides he is going to take out $50 each month.

   We are subtracting 50.

   Recursive Rule:

   $f(0) = 800$

   $f(x) = f(x-1) - 50$

   Explicit Rule:

   $f(x) = -50x + 800$

   Graph: