

Advanced Algebra

Unit 1 Assignment #16 Review #3

1. How many different sequences could model the following sequence of numbers?  
Hint: Arithmetic, Geometric...but infinite Shifted Geometric

5, 2, ...

*key point* - you need 3 terms to define a sequence

*you can make infinite amount of shifted geometric*

A.	B.	C.	D.
0	1	2	More than 2

E. None of the above.

2. Consider the equation for the series S:

$$\sum_{n=1}^5 10n - 5$$

- a. What are the first five terms? Fill out the table.

Term 1	Term 2	Term 3	Term 4	Term 5
5	15	25	35	45

$$S_n = \frac{n(U_1 + U_n)}{2}$$

*125* b. What is  $S_5$ ?

$$\frac{5(5+45)}{2}$$

- 3) Write the direct equation in the form  $y=mx+b$  for  $U_1=10$   $U_n=U_{(n-1)}-3$   $n>2$

$$U_0 = 13$$

Final answer for #3

$$y = -3x + 13$$

- 4) Write the direct equation in the form  $y=U_0 \cdot r^x$  for 4, 16, 64, ...

*ratio is x4*

Final answer for #4

$$y = 4 \cdot 4^x$$

- 5) What is the 10<sup>th</sup> term for 3, 6, 9, ...

- 6) What is the 6<sup>th</sup> term for 2, 4, 8, ...

$$y = 2 \cdot 2^x$$

Final answer for #5

$$30$$

$$U_{10} = 3 + 9(3)$$

Final answer for #6

$$2 \cdot 2^6$$

$$128$$

# Assignment #16

7) Determine the long-run value (limit) of the following geometric sequence:

$$\begin{cases} u_0 = 800 \\ u_n = (0.6)u_{n-1} - 34 \\ n \geq 1 \end{cases}$$

The limit for this sequence is:

-85

click it out or use  
your calculator in Sequence  
Mode

8) Pam needs to take out a loan for college. She will borrow \$40,000 with an APR of 3.25% compounded monthly. She will make no payments for 4 years. How much will she owe at the end of 4 years when she will start to pay it back?

Direct Formula

$$y = 40,000 \left(1 + \frac{.0325}{12}\right)^x \rightarrow 48 \text{ clicks}$$

Total amount owed

\$ 45,545.13

9) Joe purchased a house for \$150,000. The APR on the loan is 4.25% compounded monthly. He will also make \$1,600 dollar payments every month. (I would start pretty far out on your table...many house loans are for 10,15 or 30 years!)

a) Write the recursive sequence

$$\begin{aligned} U_0 &= 150,000 \\ U_n &= \left(1 + \frac{.0425}{12}\right) \cdot U_{(n-1)} - 1600 \\ n &\geq 1 \end{aligned}$$

b) How long will it take to pay off the house?

115 months      9.58 years

$$\begin{array}{r|l} 114 & 215.52 \\ \hline 115 & -1384 \end{array}$$

c) How much in total did he pay over these years?

\$ 182,615.52

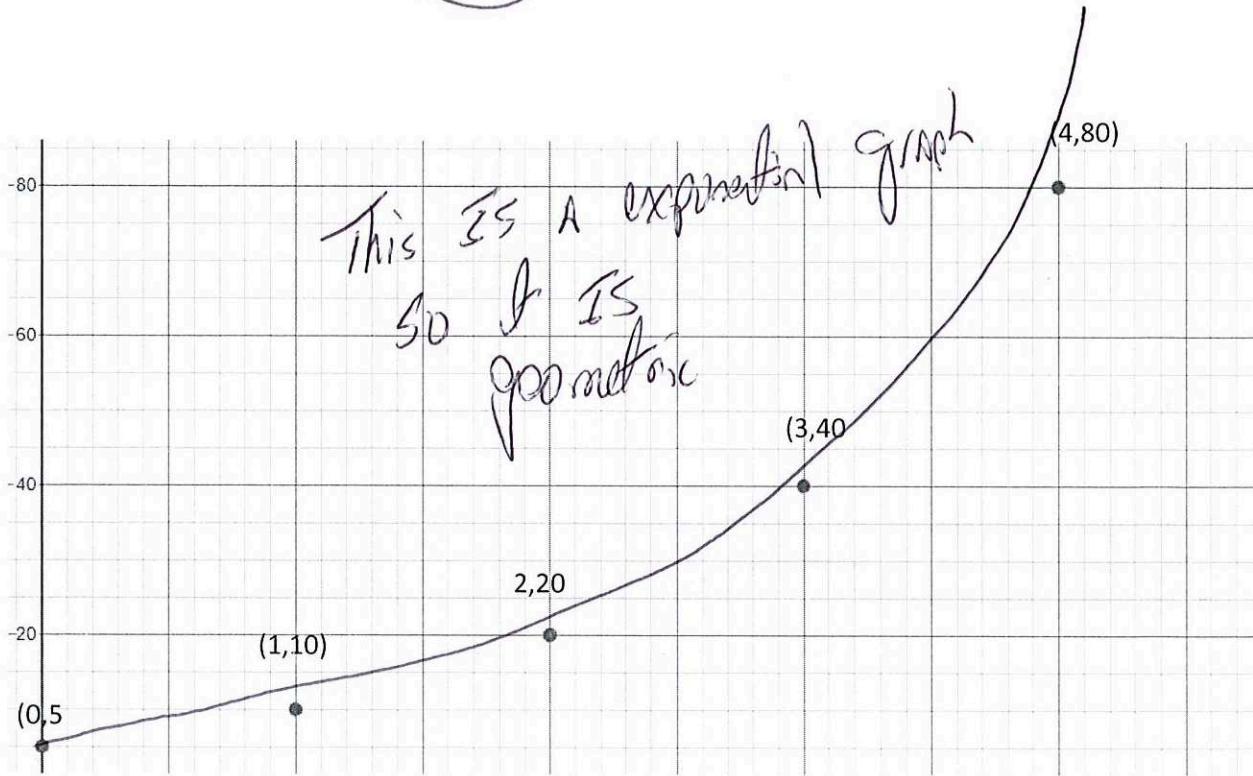
d) How much did he pay in interest in total?

\$ 32,615.52

# Assignment #16

10) Do the following points represent an

A.	B.	C.	D.
arithmetic	geometric	Shifted geometric	Impossible to tell



b) Write a recursive formula to represent the graph

$$U_0 = 5$$
$$U_n = 2 \cdot U_{(n-1)}$$
$$n \geq 1$$

c) Write a direct formula to represent the graph

$$y = 5 \cdot 2^x$$

This is nothing more than a geometric graph. You can see that it is being multiplied by 2 each time. So the rate is 2. And you know  $U_0$

11) What type of sequence does  $y = 6x - 5$  represent?

A.	B.	C.	D.
Arithmetic	Shifted Geometric	Geometric	Square root

E. None of the above.

12) What type of sequence does  $y = 2 \cdot 5^x$  represent?

A.	B.	C.	D.
Arithmetic	Shifted Geometric	Geometric	Square root

13) What type of sequence does  $y = 3 \cdot 4^x - 22$  represent?

A.	B.	C.	D.
Arithmetic	Shifted Geometric	Geometric	Square root

I can work with LIMITS:

14) What is the limit of  $\begin{cases} u_0 = 3500 \\ u_n = .87 \cdot u(n-1) + 32 \\ n \geq 1 \end{cases}$

*click it out*

Final answer for #14

246

15) What is the limit of  $\begin{cases} U_0 = 320 \\ U_n = .87 \cdot U(n-1) \\ n \geq 1 \end{cases}$

Final answer for #15

0

16) What is the limit of  $200 + 100 + 50 + 25 + \dots$ . Remembering that  $U_1 = 100$  and  $S_n = \frac{U_1(1-r^n)}{(1-r)}$

*Use sums formula*

$$\frac{100(1 - .5^{100})}{(1 - .5)}$$

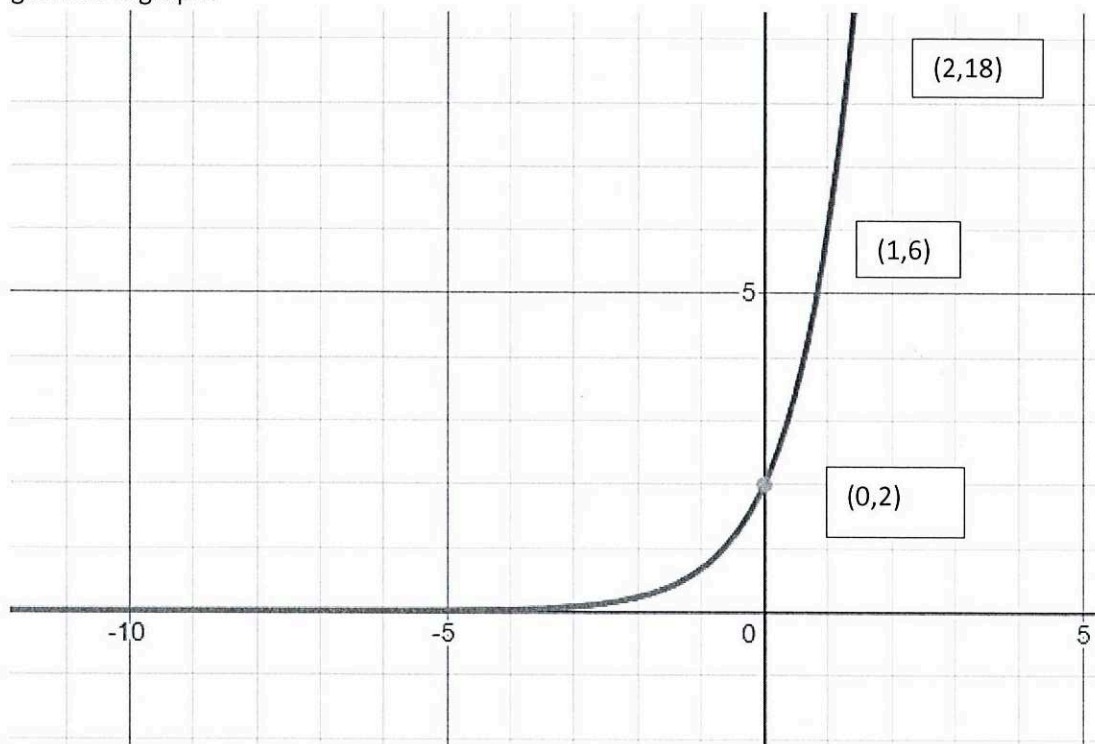
Final answer for #16

200

n	$U_n$
1	1
3	7
6	16
7	19
10	28

The above table represents an arithmetic sequence. Write the correct recursive formula for this table.

2) The below is a graph. What type of sequence would this represent: Arithmetic, geometric, or shifted geometric graph?



a) What type of sequence does this represent?

b) Write the recursive formula for this graph.

c) Write the direct formula for this graph

3) Given  $y = 28 - 3x$ , What type of sequence is this?

4) Given  $y = 4 \cdot 2^x$ , what type of sequence is this?

5) Given  $y = -12(.2)^x + 28$  what type of sequence is this?

6) How many numbers in a sequence do you need to be given to make a defined sequence?