REVEIEW: SEQUENCE AND SERIES

TEST- WEDNESDAY 5/9/18

1) Determine whether each sequence is an arithmetic or geometric sequence. State the common difference or common ratio. State if the sequence would be linear or exponential.

Sequence	Identify if the sequence is Arithmetic or Geometric (A or G)	Identify the Common difference or the Common ratio (D or R)	Identify if the sequence will model a Linear or Exponential function (L or E)		
a) 4, 7, 10, 13,	A	0 = 3	L		
b) 15, 13, 11, 9,	A	d=-2	L		
c) 1, 4, 16, 64,	0	r= 4	E		
d) 2, -4, 8, -16,	6	r=-2	E		

Determine the 10th term of the arithmetic sequence in which a_1 = 18 and a_7 = -

$$a_{n} = a_{1} + d(n-1)$$
 $a_{n} = 18 - 4(n-1)$
 $a_{n} = 18 - 4n + 4$

$$a_{n} = a_{1} + d(n-1)$$
 $a_{10} = 22 - 4(10)$
 $a_{10} = 18 - 4(10)$
 $a_{10} = 18 - 4(10)$
 $a_{10} = 18 - 4(10)$

Determine the common ratio of a geometric sequence for which $a_{1} = 2$ and $a_{10} = 2592$.

$$a_{n} = a_{1}r^{n-1}$$
 $a_{5} = 2r^{5-1}$
 $\frac{2592}{2} = 2r^{4}$
 $\frac{1290}{4}$

4)

Liuse calc! Exprey
$$y = .33(0)^{x}$$

$$\overline{r=0}$$

GEOMETRIC! == 3

A recursive formula for the sequence 18, 9, 4.5, ... is

A recursive formula for the sequence 18, 9, 4.5,

$$(P) g_1 = 18 \qquad (3) g_1 = 18$$

$$g_n = \frac{1}{2} g_{n-1} \qquad g_n = 2g_{n-1}$$

Determine the first four terms of the recursive sequence defined below.

- Given the following sequence following: -12, -7, -2, 3...
 - a. Write a recursive formula for the sequence. Orithmetic! $a_1 = -12$ $a_n = 5 + a_{n-1}$ $a_n = -12 + 5(n-1)$
 - b. Write an explicit formula for the sequence.

$$\frac{Q_{n} = Q_{1} + d(n-1)}{|Q_{n}|^{2} - 12 + 5(n-1)|}$$

c. Use the explicit formula to find the 17th term.

$$Q_{17} = -12 + 5(17 - 1)$$

$$Q_{17} = -12 + 5(10)$$

$$Q_{17} = -12 + 80$$

$$Q_{17} = 48$$

- 7) Given the following sequence <u>16</u>, 32, 64, 128......
 - a. Write a recursive formula for the sequence.

Geometric
$$a_1 = 1$$
 $a_1 = 1$ $a_1 = 2$ a_{n-1}

b. Write the explicit formula for the sequence.

$$\frac{a_{n} = a_{1} r^{n-1}}{a_{n} = 10(2)^{n-1}}$$

c. Use the explicit formula to find the 17th term.

$$\begin{array}{c}
\alpha_{17} = 10(2)^{17-1} \\
\alpha_{17} = 10(2)
\end{array}$$

$$\begin{array}{c}
\alpha_{17} = 1048576
\end{array}$$

For #8 & 9, evaluate the expression.

8)
$$\sum_{n=1}^{5} (4n+1) \frac{4(1)+1}{4(2)+1} = 9$$
$$4(3)+1 = 13$$
$$4(4)+1 = 17$$
$$4(5)+1 = +21$$

$$2^{1-1} = 2^{0} = 1$$

$$2^{1-1} = 2^{0} = 1$$

$$2^{1-1} = 2^{0} = 1$$

$$2^{1-1} = 2^{0} = 1$$

$$2^{1-1} = 2^{0} = 1$$

$$2^{1-1} = 2^{0} = 1$$

$$2^{1-1} = 2^{0} = 1$$

$$3 \times 7 = 1$$

$$2 = 1$$

$$3 \times 7 = 1$$

10) Which summation represents
$$5+7+9+11+...+43$$
? ON 1+1 MULTIC, $0 = 2$

$$\cancel{N} \quad \sum_{n=5}^{43} n$$

$$\sum_{n=1}^{20} (2n+3)$$

C.
$$\sum_{n=1}^{24} (2n-3)$$

D.
$$\sum_{n=3}^{23} (3n-4)$$

$$a_{n} = 5 + 2(n-1)$$

$$a_{n} = 5 + 2(n-1)$$

$$a_{n} = 5 + 2n-2$$
11) Write the following using sigma notation: $a_{n} = 2n+3$

$$\sum_{n=1}^{20} 3n-1$$

$$a_n = 2 + 3(n-1)$$

 $a_n = 2 + 3n - 3$
 $a_n = 3n - 1$

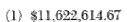
$$\frac{59 = 3n - 1}{41}$$

$$\frac{60 = 3n}{3}$$

$$a_1 = 3000 \longrightarrow 000$$

$$a_n = 0.80 a_{n-1}$$

- (N) The first row of a stadium has 3000 seats, and each row thereafter has 80 more seats than the row in front of it. LXVLU
- (X) The last row of a stadium has 3000 seats, and each row before it has 80 fewer seats than the row behind it. \ccite{N}
- (3) A bank account starts with a deposit of \$3000, and each year it grows by 80%.
- (4) The initial value of a specialty toy is \$3000, and its value each of the following years is 20% less.
- Brian deposited 1 cent into an empty non-interest bearing bank 13) account on the first day of the month. He then additionally deposited 3 cents on the second day, 9 cents on the third day, and 27 cents on the fourth day. What would be the total amount of money in the account at the end of the 20th day if the pattern continued?



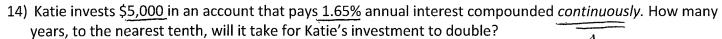
(2) \$17,433,922.00



$$\sum_{1}^{20} 1(3)^{n-1}$$

$$S_{20} = \frac{1 - 1(3)^{20}}{1 - 3}$$

use calcul (2+t)[1



Given
$$f(9) = -2$$
, which function can be used to generate the

sequence
$$-8, -7.25, -6.5, -5.75, ...$$
?

(1) $f(n) = -8 + 0.75n$

(2) $f(n) = -8 - 0.75(n - 1)$

(3) $f(n) = -8.75 + 0.75n$

(4) $f(n) = -0.75 + 8(n - 1)$

SUDSTITUTE OF COLUMN 2: -2

be used to generate the
$$d = .75$$
 $\Omega_{n} = -8 + .75(n-1)$ $\Omega_{n} = -8 + .75(n-1)$ $\Omega_{n} = -8 + .75(n-1)$ $\Omega_{n} = -8 + .75(n-1)$

PERT 1

The sequence
$$a_1 = 6$$

$$a_n = 6 \cdot 3^n$$

$$a_n = 6 \cdot 3^{n+1}$$

$$a_n = 6 \cdot 3^{n+1}$$

The sequence
$$a_1 = 6$$
, $a_n = 3a_{n-1}$ can also be written as
$$\begin{array}{cccc}
 & a_n = 6 \cdot 3^n & 3 & a_n = 2 \cdot 3^n \\
 & a_n = 6 \cdot 3^{n+1} & 3 & a_n = 2 \cdot 3^{n+1}
\end{array}$$

$$\begin{array}{ccccc}
 & a_n = 2 \cdot 3^n & 3 & a_n = 2 \cdot 3^n \\
 & a_n = 2 \cdot 3^{n+1} & 3 & 3 & 3 & 3 \\
 & a_n = 2 \cdot 3^n & 3 & 3 & 3 & 3 \\
 & a_n = 2 \cdot 3^n & 3 & 3 & 3 & 3 \\
 & a_n = 2 \cdot 3^n & 3 & 3 & 3 & 3 \\
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 & a_n = 2 \cdot 3^n & 3 & 3 & 3 & 3 \\
 & a_n = 2 \cdot 3^n & 3 & 3 & 3 & 3 \\
 & a_n = 2 \cdot$$

$$\frac{a_n}{a_{n-1}}$$

How can this sequence be recursively modeled?

(4)
$$j_1 = 250,000$$

 $j_n = j_{n-1} + 937 \rightarrow 17$ (100)

$$\sum_{n=1}^{7} 1(3)^{n-1}$$

$$\frac{1+3+9+27+.....729}{\sqrt{3}}$$
 what term #? $\frac{7}{\sqrt{3}}$ $\frac{1}{\sqrt{3}}$ $\frac{1}{\sqrt{3}}$

$$109_{3}729 = N - 1$$

Simon lost his library card and has an overdue library book. When the book was <u>5</u> d<u>ays late, he</u> 19) owed <u>\$2.25</u> to replace his library card and pay the fine for the overdue book. When the book was 21 days late, he owed \$6.25 to replace his library card and pay the fine for the overdue book.

Suppose the total amount Simon owes when the book is n days late can be determined by an <u>rithmetic</u> sequence. Determine a formula for a_n , the nth term of this sequence:

of the USC
$$\alpha_5 = 2.25$$

of USC $\alpha_{21} = 0.25$

the formula to determine the amount of money, in dollars, Simon needs to pay when the book

20) There are 50,000 deer in an area and the population is decreasing at a rate 4% in each successive year.

a) Write a geometric series formula,
$$S_n$$
, for the total number of deer over n years.
$$S_n = \frac{\alpha_1 - \alpha_1 \Gamma^{n-1}}{1 - \Gamma}$$

$$S_n = \underbrace{50000 - 50000}_{1 - .90} (.90)^n$$

b) Use this formula to find the total number of deer in 13 years, rounded to the nearest integer.

$$S_{13} = \frac{50000 - 50000 (.90)^{12}}{1 - .90}$$

 $S_{13} = \frac{514748.2912}{2912} \approx \frac{514748 \text{ cleer}}{1}$

21)	Rachel and Marc were given the information shown below about the bacteria growing in a Petri dish in their b	iology
	class.	

Time, hour, (x)	0	1	2	3	4	5					
Population (y)	250	330	580	800	1650	3000					
+ 80 × 1.32											

Rachel wants to model this information with a linear function. Marc wants to use an exponential function.

a) Which model is the better choice? Explain why you chose this model.

exponential blc it does not increase by a constant

b) Based on the model you chose in part (a), write the equation that represents this data, rounding all values to the nearest hundredth.

c) Using your equation in part (b), predict how many bacteria will be present after $\frac{10 \text{ hours}}{\chi = ()}$

d) Using your equation in part (b), predict the number of hours, to the nearest tenth, it will take for the number of bacteria to reach 500,000.

$$\frac{500.000}{215.98} = \frac{215.98(1.65)^{x}}{215.98}$$

$$\frac{2315.0291 = 1.65^{x}}{109.605}$$

$$\frac{2315.0291 = x}{1005}$$

- 22) A gymnast performs a series of full circle swings during a high bar routine. The distance that the gymnast's feet are above the ground at a given time, t in seconds, can be modeled by the equation: $f(t) = -85\cos\left(\frac{8\pi}{5}t\right) + 109$.
 - a) What is the midline of this function?

b) What is the amplitude of this function? 85

d) What is the period of this function? Explain what this value means in regards to the gymnast's swing.