

Name \_\_\_\_\_  
 Sequence Review

Date \_\_\_\_\_  
 Algebra I

*Add "d"*

Explicit formulas

*Multiply by "r"*

Arithmetic:  $a_n = a_1 + (n - 1)d$

Geometric:  $a_n = a_1 \cdot r^{n-1}$

Determine whether each sequence is arithmetic, geometric or neither. If it is arithmetic, state the common difference ( $d$ ). If it is geometric, state the common ratio ( $r$ ).

1) 1, -4, 16, -64, ...	2) 156, 132, 120, -97, ...  $\frac{132}{156} \stackrel{?}{=} \frac{120}{132} \stackrel{?}{=} \frac{-97}{120}$
3) -12, -5, 2, 9, ...	4) 89, 95, 101, 107, ...
5) 36, 6, 1, $\frac{1}{6}$ , ...  <i>Geom</i> $r = \frac{1}{6}$ $\frac{6}{36} = \frac{1}{6} = \frac{1/6}{1} =$	6) -1, 1, -1, 1, -1, ...

For each arithmetic sequence, write an explicit equation for the  $n$ th term.

7) 35, 32, 29, 26, ...	8) 9, 14, 19, 24, ...
9) -3, -1, 1, 3, ...	10) -30, -40, -50, -60, ...

For each geometric sequence, write an explicit equation for the  $n$ th term.

11) -1, 6, -36, 216, ...	12) -3, -15, -75, -375, ...
13) $2, \frac{1}{2}, \frac{1}{8}, \frac{1}{32}, \dots$	14) -4, -12, -36, -108, ...

- 15) If a sequence is defined recursively by  $f(0) = 7$  and  $f(n+1) = 5f(n) + 2$  for  $n \geq 0$ , then  $f(3)$  is equal to what number?

$$\begin{aligned}
 f(3) &= f(2+1) = 5f(2) + 2 = 5(187) + 2 = 937 \\
 f(2) &= f(1+1) = 5f(1) + 2 = 5(37) + 2 = 187 \\
 f(1) &= f(0+1) = 5f(0) + 2 = 5(7) + 2 = 37 \\
 f(n) &= f(n+1) = 5f(n) + 2
 \end{aligned}$$

- 16) If  $f(1) = 2$  and  $f(n) = 3f(n-1) - 8$ , then what does  $f(4)$  equals what number?

-50

# 16, 18, 19, 1-13 odds

- 17) The fourth term of an arithmetic sequence is 15 and the sixth term is 25. If the first term is  $a_1$ , what is an explicit equation for the  $n$ th term of this sequence?

$a_4 = 15$

$a_n = a_1 + d(n-1)$

$a_6 = 25$

$0, 5, 10, 15, 20, 25$

$a_1, a_2, a_3, a_4, a_5, a_6$

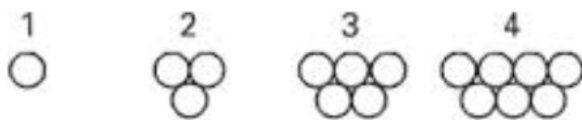
$d = 5$   
 $a_1 = 0$

$a_n = a_1 + d(n-1)$   
 $a_n = 0 + 5(n-1)$   
 $a_n = 0 + 5n - 5$   
 $a_n = 5n - 5$

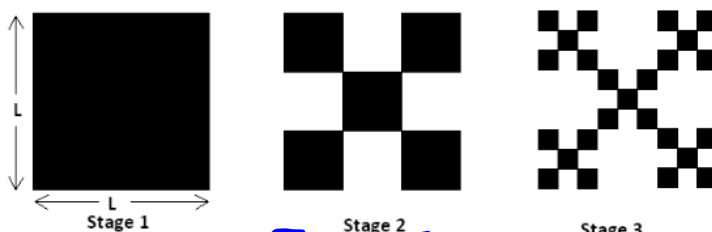
- 18) A chain e-mail instructs the recipient to forward the e-mail to four more people. The table shows the number of rounds of sending the e-mail and the number of new e-mails generated. Write an explicit equation for the  $n$ th term of the sequence.

Number of rounds sending e-mail, $n$	1	2	3	4
Number of new e-mails generated, $a_n$	1	4	16	64

19) Write an explicit equation for the  $n$ th term of the sequence



20) Write an explicit equation for the  $n$ th term of the sequence



$a_1 = 1$   
 $a_2 =$   
 $a_3 =$

$\frac{1}{a_1}, \frac{5}{a_2}, \frac{25}{a_3}, \dots$   
 $\swarrow \quad \searrow$   
 $.5 \quad .5$

$a_1 = 1$   
 $r = 5$

$a_n = a_1 \cdot r^{n-1}$   
 $a_n = 1 \cdot 5^{n-1}$   
 $a_3 = 1 \cdot 5^{3-1}$   
 $1 \cdot 5^2$   
 $1 \cdot 25 = 25$