

SM 1 Chapter 6B Practice Quiz

Name \_\_\_\_\_

Date \_\_\_\_\_

Period \_\_\_\_\_

Find the next three terms in the following geometric sequences. Then identify the common ratio and write an equation for the nth term of the sequence (explicit formula).  $\rightarrow a_n = a_1 (r)^{n-1}$

1.)  $\frac{1}{3}$  2, 12, 72, ...  $r = \frac{12}{2} = 6$   
 $r = \frac{72}{12} = 6$

Next three terms:

432, 2592, 15552

Common ratio (r):

(the number you multiply each term by or take a term and divide by previous)  $r = 6$

Explicit Formula:

$a_n = \frac{1}{3}(6)^{n-1}$

Find  $a_6 \rightarrow 6^{\text{th}}$  term ( $n=6$ )

$\frac{1}{3}(6)^{6-1} = \frac{1}{3}(6)^5$   
 7776

$\frac{1}{3} \cdot \frac{7776}{1} = \frac{7776}{3} = \boxed{2592}$

2.) 36, 6, 1, ...  $r = \frac{6}{36} = \frac{1}{6}$   
 $r = \frac{1}{6}$

Next three terms:

$\frac{1}{6}, \frac{1}{36}, \frac{1}{216}$

Common ratio (r):

$r = \frac{1}{6}$

Explicit Formula:

$a_n = 36\left(\frac{1}{6}\right)^{n-1}$

Find  $a_7$  ( $n=7$ )

$36\left(\frac{1}{6}\right)^{7-1} = 36\left(\frac{1}{6}\right)^6$

$\frac{36}{1} \cdot \frac{1}{46656} = \boxed{\frac{1}{1296}}$

\* Remember that if you see the pattern as dividing by a number, that means r is a fraction! \*

3.) 75, 15, 3,  $\frac{3}{5}$ , ...  $r = \frac{15}{75} = \frac{1}{5}$   
 $r = \frac{3}{15} = \frac{1}{5}$

Next three terms:

$\frac{3}{25}, \frac{3}{125}, \frac{3}{625}$

Common ratio (r):

$r = \frac{1}{5}$

Explicit Formula:

$a_n = 75\left(\frac{1}{5}\right)^{n-1}$

Find  $a_5$  ( $n=5$ )

$75\left(\frac{1}{5}\right)^{5-1} = 75\left(\frac{1}{5}\right)^4 = \frac{75}{1} \cdot \frac{1}{625}$

$\frac{75}{625} = \boxed{\frac{3}{25}}$  (but also, it's one we already found in our list so we could have just used that)

4.) 2, -6, 18, ...  $r = \frac{-6}{2} = -3$   
 $r = \frac{18}{-6} = -3$

Next three terms:

-54, 162, -486

Common ratio (r):

$r = -3$

Explicit Formula:

$a_n = 2(-3)^{n-1}$

Find  $a_8$  ( $n=8$ )

$2(-3)^{8-1} = 2(-3)^7 = 2 \cdot -2187$

$\boxed{-4374}$

Use the following sequence equations to fill in the blanks in the table below:

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

$$a_n = a_1(r)^{n-1}$$

$$a_n = ra_{n-1}$$

$$a_n = a_{n-1} + d$$

5.)

	Arithmetic	Geometric
Explicit	$a_n = d(n-1) + a_1$	$a_n = a_1(r)^{n-1}$
Recursive	$a_n = a_{n-1} + d$	$a_n = r \cdot a_{n-1}$

Reminder:  $a_1$  means first term  
 $a_{n-1}$  just means previous term  
 $n$  represents the term's position in the sequence (ex: to find 20<sup>th</sup> term,  $n=20$ )  
 $d$  = common difference (amount added to find next term - Arithmetic)  
 $r$  = common ratio (amount multiplied to find next term - Geometric)

6.) When writing a recursive rule/formula, what do you need to write besides the  $a_n = \dots a_{n-1} \dots$  part?

State the first term! ( $a_1 = \underline{\hspace{2cm}}$ )  
*(otherwise you couldn't write the sequence because you know the pattern but not what # to start on)*

Use the recursive rule to write the first six terms of the sequence.

7.)  $a_1 = 3, a_n = a_{n-1} + 4$

3, 7, 11, 15, 19, 23  
*+4 +4*

What type of sequence is this?

Arithmetic

8.)  $a_1 = 8000, a_n = \frac{1}{2}a_{n-1}$  (or 0.5)

8000, 4000, 2000, 1000, 500, 250  
*·1/2 ·1/2*

What type of sequence is this?

Geometric

Determine whether each sequence is *geometric* or *arithmetic* and identify the common ratio or difference.

Then write the explicit formula and a recursive rule for the sequence.

9.)  $8, 3, -2, -7, -12, \dots$   
 *$a_1 = 8$   $-5$*

Geometric or Arithmetic?

Common ratio/difference:  $d = -5$   
 $3-8 = -5$   $-2-3 = -5$  etc.

Recursive Rule:

$a_1 = 8$   
 $a_n = a_{n-1} - 5$

Explicit Formula:

$a_n = -5(n-1) + 8$

$a_n = -5n + 5 + 8$

$a_n = -5n + 13$

10.)  $48, 12, 3, \dots$   
 *$a_1 = 48$   $\div 4$*

Geometric or Arithmetic?

Common ratio/difference:  $r = \frac{1}{4}$   
 $\frac{12}{48} = \frac{1}{4}$   $\frac{3}{12} = \frac{1}{4}$

Recursive Rule:

$a_1 = 48$   
 $a_n = \frac{1}{4}a_{n-1}$

Explicit Formula:

$a_n = 48\left(\frac{1}{4}\right)^{n-1}$

11.)  $4, 20, 100, 500, 2500, \dots$   
*·5 ·5*

Geometric or Arithmetic?

Common ratio/difference:  $r = 5$   
 $\frac{500}{100} = 5$   $\frac{100}{20} = 5$   $\frac{20}{4} = 5$

Recursive Rule:

$a_1 = 4$   
 $a_n = 5a_{n-1}$

Explicit Formula:

$a_n = 4(5)^{n-1}$

12.)  $-76, -50, -24, \dots$   
*+26 +26*

Geometric or Arithmetic?

Common ratio/difference:  $d = 26$   
 $-24 - (-50) = 26$   
*(+)*

Recursive Rule:

$a_1 = -76$   
 $a_n = a_{n-1} + 26$

Explicit Formula:

$a_n = 26(n-1) - 76$

$a_n = 26n - 26 - 76$

$a_n = 26n - 102$