

Arithmetic Sequence HW Issue:

Write the rule for a sequence given two terms.

$$\underline{a_1=3} \text{ and } \underline{\frac{a_{14}=-23}{n=14}}$$

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

$$\overset{\uparrow}{-23} = 3 + d(14-1)$$

$$-23 = 3 + 13d$$

$$-26 = 13d$$

$$d = -2$$

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

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

$$a_n = -2n + 5$$

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

$$a_1 = -5 \quad a_7 = 91$$

$$a_n = 16n - 21$$

Geometric Sequence	Sequence where the ratio between any two terms is constant.	
Common Ratio	The numerical ratio between terms (variable: r)	
Examples	<p>Directions: Determine whether the sequence is geometric. If yes, identify the common ratio and give the next three terms.</p> <p>$\{6, 12, 24, 48, \dots\}$ $r=2$ $96, 192, 384$ yes</p> <p>$\{4, -1, \frac{1}{4}, -\frac{1}{16}, \dots\}$ $r=-\frac{1}{4}$ $\frac{1}{64}, -\frac{1}{256}, \frac{1}{1024}$ yes</p> <p>(ex: divide by 3 is a ratio of $\frac{1}{3}$)</p> <p>The n^{th} term of any geometric sequence can be found using the formula:</p>	
Geometric Sequence Formula	$a_n = a_1 \cdot r^{n-1}$ <p>where a_1 is the <u>first term</u> and r is the <u>common ratio</u></p>	
Examples	<p>Directions: Write a rule for each sequence, then find a_6.</p> <p>$\{1, 5, 25, 125, \dots\}$ $r=5$ $a_n = 1 \cdot 5^{n-1}$ $a_6 = 5^{6-1} = 5^5 = 3125$</p> <p>$\{130, 65, 32.5, 16.25, \dots\}$ $r=\frac{1}{2}$</p> <p>$a_1 = 13$ and $a_4 = 4459$; Find a_3</p> <p>$a_2 = 6$ and $a_5 = 0.048$; Find a_4</p>	
Geometric Series	<p>A <u>geometric series</u> is the <u>sum</u> of a geometric sequence. To find the sum, use the following formula:</p>	
	$S_n = \frac{a_1(1-r^n)}{1-r}$ <p>where n is the <u>number of terms</u>, a_1 is the <u>first term</u> and r is the <u>common ratio</u>.</p>	
	<p>$\{3 + 6 + 12 + 24 + \dots + 6144\}$</p> <p>$6144 = 3 \cdot (2)^{n-1}$ $2048 = 2^{n-1}$ $11 = n - 1$ $n = 12$</p> <p>2^{11}</p>	<p>$\sum_{i=1}^8 -32 \cdot \left(-\frac{1}{2}\right)^{i-1}$ $r = -\frac{1}{2}$ $n = 8$ $a_1 = -32$</p> <p>$S_n = \frac{-32(1 - (-\frac{1}{2})^8)}{1 - (-\frac{1}{2})}$ $= -21.25$</p>