

Name	_ Date	_ Period	Teacher
	What are sequ	iences?	
	l		
At the • beginning	At the		At the beginning
After I ● ● ●		••	After I minute
After 2 minutes	After I		After 2 minutes
After 3 minutes	After 2 minutes	•• •• ••	After 3 minutes
Write the terms in the sequence.	Write the terms in t	he sequence.	Write the terms in the sequence.
How would you find the next term?	How would you find t	, he next term?	Liow would you find the next term?

Geometric Sequences			
What is a geometric sequence?	What is a common ratio?		

Swing Problem

Samantha's dad gives her a push on the swing. At her highest point, she is 5ft off of the ground. If he does not give her another push, each progressive swing will be 85% of the height of the previous swing. How would you find the height of the next three swings? Use this information to write a formula for the 10th swing.



Finding the Height of Each Swing			
# of Swings	Height of Swing		
1	<i>a</i> <sub>1</sub> = 5		
2	<i>a</i> <sub>2</sub> =		
3	<i>a</i> <sub>3</sub> =		
4	$a_4 =$		
10	$a_{10} =$		

Name <u>KEY</u>	Date	Period	Teacher			
	What are sequences?					
They a	are a string of object	s that follow a particu	lar pattern.			
At the • beginning	At the beginning		At the beginning			
After I ● ● ●		•• ••	After I minute ●● ●●			
After 2 minutes	After I minute		After 2 minutes			
After 3 minutes	<ul><li>After 2</li><li>minutes</li></ul>	• • • • • •	After 3 minutes			
Write the terms in the sequence 1, 3, 9, 27 How would you find the next term Multiply the last term by 3	e. Write the ten 41 n? How would you Multiply t	ms in the sequence. 0, 20, 10 1 find the next term? he last term by $\frac{1}{2}$	Write the terms in the sequence. 3, 6, 12, 24 How would you find the next term? Multiply the last term by 2			

Geometric Sequences				
What is a geometric sequence?	What is a common ratio?			
A sequence in which each term after the first is found by multiplying the previous term by a constant called the common ratio.	The constant that is multiplied by each term in a geometric sequence in order to find the next term.			

Swing Problem

Samantha's dad gives her a push on the swing. At her highest point, she is 5ft off of the ground. If he does not give her another push, each progressive swing will be 85% of the height of the previous swing. How would you find the height of the next three swings? Use this information to write a formula for the 10th swing.



Finding the Height of Each Swing			
# of Swings	Height of Swing		
1	<i>a</i> <sub>1</sub> = 5		
2	$a_2 = 5(0.85)$		
3	$a_3 = 5(0.85)(0.85)$		
4	$a_4 = 5(0.85)(0.85)(0.85)$		
10	$a_{10} = 5(0.85)^{10-1}$		

Name	Date	Period	Teach	er		
Revisiting Our Geometric Sequences Determine the common ratio for each sequence. Then, find the next term.						
1, 3, 9, 27,	common	ratio (r) =	next te	rm =		
40, 20, 10,	common	ratio (r) =	next te	rm =		
3, 6, 12, 24,	common	ratio (r) =	next te	rm =		
	Geometric Sequences:	Finding the N	lext Terms			
Step I: Find the common ratio (r) by dividing a term in the geometric sequence by its preceding term. Step 2: Multiply the common ratio (r) by the term at the end of the sequence. Continue until you have the desired amount of terms.	Find the next 2 terms in the 324 108 36 What is the common ratio The next 2 numbers in the sequ	sequence. (r)? ence are	Find the ne: —3 What it The next 3 n	xt 3 terms — 15 s the comr umbers in _ ,,	s in the second — 75 mon ratio (i the seque and	equence. r)? nce are
 Th	Geometric Sequences: Finding the nth Term   The formula for finding the nth term in a geometric sequence is $a_1 = a_2 \cdot x^{n-1}$					
Step 1: Find the common ratio (r) by dividing a	Assuming that the geometric continues, what is the height of a	sequence bouncing ball	Assuming t	hat the ge ow many b	ometric se acteria will	equence be in the
term in the geometric sequence by its	on the 9 <sup>in</sup> bounce?			e ar the en	d of 7 hou	rsir
preceding term.	Height 3 1.8	1.08	Bacteria	250	500	1000
given values and the common ratio into the	Find the values for each varia formula.	Find the values for each variable in the formula.			e in the	
	$a_1 = n = r =$ r = Use the formula for finding the geometric sequence to fi	nth term in a nd $a_9$ .	$a_1 = n = r =$ r = Use the formageometry	ula for finc tric sequer	ling the nth nce to finc	n <b>term in an</b> 1 a <sub>7</sub> .

Name	<u>KEY</u>	Dat	te		_ Perioc	ł	T <del>e</del> ache	er		
Revisiting Our Geometric Sequences Determine the common ratio for each sequence. Then, find the next term.										
	1, 3, 9, 1	27,		com	mon ratio	(r)	= 3 next to	erm = <mark>8</mark> 1	L	
	40,20	, 10,		con	nmon rati	o (I	r) = $\frac{1}{2}$ next 1	term = 5		
	3, 6, 12	2,24,		com	mon ratic	) (r)	) = 2 next te	erm = 48	}	
		Geometric	: Sequen	ices: Fir	nding the	Ne	ext Terms			
Step I: Find the or ratio $(r)$ by dividi term in the geor sequence by its preceding term.	common ing a metric	Find the next 324 What is t	<b>2 terms</b> 1 108 the commo	in the se 36 on ratio (rj	quence. )?		Find the nex —3 What is	kt 3 terms — 15 s the comr	s in the se — 75 mon ratio (r	<b>&gt;quence</b> . ; r)?
Step 2: Multiply t common ratio (r) term at the end sequence. Conti you have the de amount of terms	the ) by the of the inue until esired s.	$r = \frac{108}{324} = \frac{1}{3}$ The next 2 numbers in the sequence are 12 and 4				$r = \frac{(-15)}{(-3)} = 5$ The next 3 numbers in the sequence are $-375, -1,875, \text{ and } -9,375$				
		Geometr	ic Seque	ences: F	inding the	e n	th T <del>e</del> rm			
	The	e formula for fi	inding the	e nth te	rm in a ge	eon	netric seque	ence is		
the nth term in the sequence $a_n = a_1 \cdot r^n - 1$ the position in the sequence the first number in the sequence ratio										
Step I: Find the $ratio (r)$ by dividing term in the geor	common ing a metric	Assuming that continues, what is on	Assuming that the geometric sequence continues, what is the height of a bouncing ball on the 9 <sup>th</sup> bounce?				Assuming th continues, ho culture	hat the ge ow many be at the end	ometric se acteria will d of 7 hou	quence be in the rs?
preceding term.	<b>)</b>	# of Bounces	1	2	3		Hour(s)	1	2	3
Oton 2. Cubotting		Height	3	1.8	1.08		Bacteria	250	500	1000

Step 2: Substitute your given values and the common ratio into the equation.

n = 9

3 1.8 1.08 Bacteria 250 500 Find the values for each variable in the Find the values for each variable in the formula. formula.  $a_1 = 250$ n = 7 $a_1 = 3$  $r = \frac{500}{250} = 2$  $r = \frac{1.8}{3} = 0.6$ Use the formula for finding the nth term in a Use the formula for finding the nth term in an geometric sequence to find  $a_9$ . geometric sequence to find  $a_7$ .

> $a_9 = 3 \cdot (0.6)^{9-1}$  $a_9 \approx 0.0504$

 $a_7 = 250 \cdot (2)^{7-1}$  $a_{7} \approx 16,000$ 

Name	Date	Period_	Teacher				
	Geometric Sequences: Write an Equation for the nth Term						
Step I: Write the formula for the nth term.	Write an equation for the nth geometric sequence 21, -6	t <b>erm in the</b> 3, 189,	Write an equation for the nth term in the geometric sequence 162,108,72,				
Step 2: Use the given sequence to determine $a_1$ and $r$ . Substitute your values into the formula.							

Find a Term in the Sequence Given a Term in the Sequence and the Common Ratio				
Step I: Write the formula for the nth term.	Find the 12 <sup>th</sup> term of a geometric sequence for which $a_5 = 17$ and $r = -0.4$ .	Find the 5 <sup>th</sup> term of a geometric sequence for which $a_7 = -113$ and $r = 6$ .		
Step 2: Determine which terms you are given in the sequence and use that information to substitute the values for $a_n$ , and $r$ into your formula.				
Step 3: Solve for $a_1$ .				
Step 4: Write the formula for the nth term again.				
Step 5: Substitute the values for $a_1, r$ , and $n$ .				
Step 6: Simplify.				

Write it Out:

What do you know about geometric sequences? You can use diagrams, examples, and words to show what you know.

Name <u>KEY</u>	Date Period	Teacher				
Geometric Sequences: Write an Equation for the nth Term						
Step I: Write the formula for the nth term.	Write an equation for the nth term in the geometric sequence 21, -63, 189,	Write an equation for the nth term in the geometric sequence 162,108,72,				
	$a_1 = 21$ and $r = \frac{(-63)}{21} = -3$	$a_1 = 162$ and $r = \frac{108}{162} = \frac{2}{3}$				
Step 2: Use the given sequence to determine $a_1$ and $r$ . Substitute your values into the formula.	$a_n = a_1 \cdot r^{n-1}$ $a_n = 21 \cdot (-3)^{n-1}$	$a_n = a_1 \cdot r^{n-1}$ $a_n = 162 \cdot \left(\frac{2}{3}\right)^{n-1}$				

Find a Term in the Sequence Given a Term in the Sequence and the Common Ratio					
Step I: Write the formula for the nth term.	Find the 12 <sup>th</sup> term of a geometric sequence for which $a_5 = 17$ and $r = -0.4$ .	Find the 5 <sup>th</sup> term of a geometric sequence for which $a_7 = -113$ and $r = 6$ .			
Step 2: Determine which terms you are given in the sequence and use that information to substitute the values for $a_n$ , and $r$ into your formula.	$a_n = a_1 \cdot r^{n-1}$ $17 = a_1 \cdot (-0.4)^{5-1}$ $17 = a_1 \cdot 0.0256$ $664.0625 = a_1$	$a_n = a_1 \cdot r^{n-1}$ -113 = $a_1 \cdot (6)^{7-1}$ -113 = $a_1 \cdot 46656$ -0.0024 $\approx a_1$			
Step 3: Solve for $a_1$ .					
Step 4: Write the formula for the nth term again.	$a_n = a_1 \cdot r^{n-1}$ $a_{12} = 664\ 0625 \cdot (-0\ 4)^{12-1}$	$a_n = a_1 \cdot r^{n-1}$			
Step 5: Substitute the values for $a_1, r$ , and $n$ .	$a_{12} \approx -0.0278$	$a_5 \approx -3.1104$			
Step 6: Simplify.					

Write it Out:

What do you know about geometric sequences? You can use diagrams, examples, and words to show what you know.



- I. Cut along the solid lines of the matchbook foldable.
- 2. Cut along the solid lines of glue in definitions.
- 3. Glue the definitions on the bottom side of each matchbook flap.
- 4. Use the blank space inside of your matchbook to write examples of the formula for finding a term in a geometric sequence.

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