Name _____
Date _____

Topic: **Arithmetic and Geometric Sequences**

Question/Main Ideas:	Notes:
sequence	a number pattern
arithmetic sequence	a pattern in which the same number is added to get each new number in the sequence
term	any single number in a sequence
common difference	The number added (or subtracted) at each stage of an arithmetic sequence
geometric sequence	a pattern in which the same number is multiplied to get each new number in the sequence
common ratio	The ratio of a term to the previous term (the number being multiplied)
Examples:	+4 +4 +4 3, 7, 11, 15... arithmetic common difference is 4 n+4 ×2 ×2 ×2 3, 6, 12, 24... geometric common ratio is ~~3~~ 2 ~~3n~~ 2^n

1, 2, 4, 7, 11, 16... Neither
×1 ×2 ×3 ×4

wY7xA3P

	Fill in the next 2 terms in the sequence:	Type of Pattern: arithmetic, geometric	What is the rule?	Common Difference or Common Ratio	Write an expression to describe the relationship between consecutive terms in the sequence.
	-5, -8, -11, -14, -17, -20	A		-3	$n-3$
	120, 60, 30, 15, _____, _____	G		$\frac{1}{2}$	$\frac{n}{2}$
	2.1, 2.2, 2.3, 2.4, _____, _____	A		.1	$n+.1$
	31, 22, 13, 4, _____, _____	A		-9	$n-9$
	2, 12, 72, 432, _____, _____	G		6	$6n$
	-57, -50, -43, -36, _____, _____	A		7	$n+7$
	4.8, 4.2, 3.6, 3.0, _____, _____	A		-.6	$n-.6$
	10, 25, 62.5, 156.25, _____, _____	G		2.5	$2.5n$
	625, 125, 25, 5, _____, _____	G		$\frac{1}{5}$	$\frac{n}{5}$
	1, -5, 25, -125, _____, _____	G		-5	$-5n$

homework

What is Bright and Asks a Lot of Questions?

For each exercise, write a pattern of numbers, then find the LAST number you write in one of the boxes at the bottom of the page. Write the exercise letter in that box.

Write the next three numbers in each pattern.

D. 1, 3, 5, 7, ☐, ☐, ☐

B. $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}$, ☐, ☐, ☐

U. $2, 3\frac{1}{2}, 5, 6\frac{1}{2}$, ☐, ☐, ☐

A. 100, 81, 64, 49, ☐, ☐, ☐

D. 1000, 100, 10, 1, ☐, ☐, ☐

H. 15, 30, 45, 60, ☐, ☐, ☐

E. $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}$, ☐, ☐, ☐

A. 1, 3, 6, 10, ☐, ☐, ☐

U. 1, 3, 9, 27, ☐, ☐, ☐

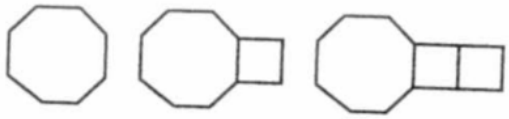
H. $1, \frac{1}{4}, \frac{1}{16}, \frac{1}{64}$, ☐, ☐, ☐

The figures shown below are made with toothpicks. Draw the next two figures in each pattern. Then count the number of toothpicks needed for each figure.

T.

R.

B.



Solve.

N. Antonio has $80 in his savings account. He plans to add $32 each month for the next 6 months. How much will Antonio have in his account at the end of each month?

L. There was already 14 in. of snow on the ground when the blizzard started. Each hour for the next 8 hours, 2.5 in. of snow fell. How much snow was on the ground at the end of each hour?

W. Altus is climbing 3000 ft to the top of a mountain. The temperature was 60°F when he started, but he expects it to drop 3.6° with each 1000 ft of elevation gain. Find the expected temperature after each 1000-ft gain.

16	36 in.	$\frac{1}{4096}$	11	$272	13	26	$\frac{1}{128}$	0.001	$284	49.2°F	105	28	21	$\frac{1}{512}$	20	729	34 in.	$\frac{7}{8}$

PROPERTIES OF REAL NUMBERS

In math, properties are statements that are true for any numbers. They justify steps when simplifying expressions and solving equations.

change order

COMMUTATIVE Property

Main Idea: the order in which numbers are added or multiplied does not matter

ADDITION EXAMPLES	MULTIPLICATION EXAMPLES
• $a + b = b + a$	• $a \times b = b \times a$
• $3 + 5 = 5 + 3$	• $3 \times 5 = 5 \times 3$
• $2 + (4 + 6) = 2 + (6 + 4)$	• $2 \times (4 \times 6) = 2 \times (6 \times 4)$
• $3 + (8 + 1) = (8 + 1) + 3$	• $3 \times (8 + 1) = (8 + 1) \times 3$

Same order

ASSOCIATIVE Property

Main Idea: the way numbers are grouped when added or multiplied does not matter

ADDITION EXAMPLES	MULTIPLICATION EXAMPLES
• $1+(2+3)=(1+2)+3$	• $1\cdot(2\cdot3)=(1\cdot2)\cdot3$
• $a+(b+c)=(a+b)+c$	• $a\cdot(b\cdot c)=(a\cdot b)\cdot c$
• $(8+5)+2=8+(5+2)$	• $(8\cdot5)\cdot2=8\cdot(5\cdot2)$
• $3+(x+y)=(3+x)+y$	• $3\cdot(x\cdot y)=(3\cdot x)\cdot y$

IDENTITY Property

Main Idea: adding zero or multiplying by one does not change the number

ADDITION EXAMPLES	MULTIPLICATION EXAMPLES
• $a+0=a$	• $a\times1=a$
• $5+0=5$	• $5\times1=5$
• $x\cdot y+0=x\cdot y$	• $x\cdot y\cdot1=x\cdot y$
• $\frac{1}{3}+0=\frac{1}{3}$	• $\frac{1}{3}\cdot1=\frac{1}{3}$

INVERSE Property

Main Idea: Adding the opposite = 0 multiplying the reciprocal is 1

ADDITION EXAMPLES	MULTIPLICATION EXAMPLES
• $a + -a = 0$	• $a \cdot \frac{1}{a} = 1$
• $5 + -5 = 0$	• $5 \times \frac{1}{5} = 1$
• $\frac{1}{3} + -\frac{1}{3} = 0$	• $\frac{2}{3} \times \frac{3}{2} = 1$
• $x + -x = 0$	• $x \cdot \frac{1}{x} = 1$

PROPERTY OF ZERO

Main Idea: Multiplying by zero = 0

EXAMPLES

- $x \cdot 0 = 0$
- $8 \cdot 0 = 0$

DISTRIBUTIVE Property

Main Idea: multiplying by the sum of two numbers equals the sum of the two products.

EXAMPLES

- $a(b+c) = ab + ac$
- $2(3+4) = 2(3) + 2(4)$
- $3(x+2) = 3x + 6$
- $5(3+x) = 15 + 3x$

Name That Property!	
1. $4 + (a + b) = (4 + a) + b$	Associative
2. $2(x + 9) = 2x + 2 \cdot 9$	Distributive
3. $(2x) \cdot 1 = 2x$	Identity
4. $(m + n) + 3 = (n + m) + 3$	Commutative
5. $(5 - k) \cdot 0 = 0$	Zero
6. $7(w + 3) = (w + 3)7$	Commutative
7. Name the additive inverse of 16.	-16 $(16 + -16 = 0)$
8. Name the multiplicative inverse of $\frac{3}{7}$.	$\frac{7}{3}$ $(\frac{3}{7} \times \frac{7}{3} = 1)$

$a(b+c) = ab + ac$

$3(x+2) = 3x + 3(2)$

$3x + 6$