CW: 4.1.4: Arithmetic vs. Geometric Sequences

Decide whether the function forms an arithmetic or geometric sequence or neither. If the sequence is arithmetic or geometric, find the common difference or common ratio. Then find the next three terms in the sequence.

Arithmetic: $y = mx + b$ ← zero term, ← common diff.

Geometric: $y = a \cdot b^x$ ← zero term, ← common ratio

1) 5, 8, 11, 14 … (+3, +3, +3)

Circle: (Arithmetic) Geometric Neither

Common Difference/Ratio: 3

Next 3 Terms: 17, 20, 23

Zero Term = 2

f(x) = $3x + 2$

2) 6, -12, 24, -48,… (×-2, ×-2, ×-2)

Circle: Arithmetic (Geometric) Neither

Common Difference/Ratio: -2

Next 3 Terms: 96, -192, 384

Zero Term = -3 (6 ÷ -2)

f(x) = $-3(-2)^x$

3) 12, 18, 27, 40.5,… (18/12 = 1.5, 27/18 = 1.5, 40.5/27 = 1.5)

Circle: Arithmetic (Geometric) Neither

Common Difference/Ratio: 1.5

Next 3 Terms: 60.75, 91.125, 136.6875

Zero Term = 8 (12 ÷ 1.5)

f(x) = $8(1.5)^x$

4) 5, 8, 13, 20,… (8/5 = 1.6, 13/8 = 1.625)

Circle: ~~Arithmetic~~ ~~Geometric~~ (Neither)

Common Difference/Ratio: _____

Next 3 Terms: _____, _____, _____

Zero Term = _____

f(x) = _____

5) 11, 7, 3, -1,…

Circle: (Arithmetic) Geometric Neither

Common Difference/Ratio: -4

Next 3 Terms: -5, -9, -13

Zero Term = 15

f(x) = $-4x + 15$

6) 192, 96, 48,…

Circle: Arithmetic (Geometric) Neither

Common Difference/Ratio: 1/2

Next 3 Terms: 24, 12, 6

Zero Term = 384

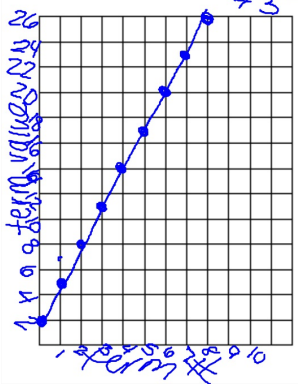
f(x) = $384(\frac{1}{2})^x$

Complete the table for each sequence. Make a graph for the table. Determine whether the sequence is arithmetic or geometric. Write an equation to represent the relationship between the term number and the value of the term. Use your equation to find a given term.

Problem 1

x: term number	0	1	2	3	4	5	6	7	8	9	10
y: term value	2	5	8	11	14	17	20	23	26	29	32

(+3, +3, +3, +3)



a. *Circle:* (Arithmetic) Geometric

b. What is the (common difference) or common ratio? 3

c. *Equation:* $f(x) =$ $3x + 2$

d. Use your equation to find the 20th term.

$f(20) = 3(20) + 2$

$= 62$

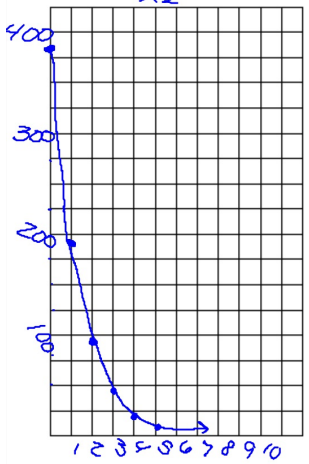
Problem 2

96 ÷ 192 = ½

×½ ×½ ×½

	term number	0	1	2	3	4	5
x							
y	term value	384	192	96	48	24	12

×2



a. *Circle:* Arithmetic **Geometric**

b. What is the common difference **or common ratio?**

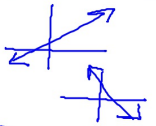
c. *Equation:* $f(x) = 384(\frac{1}{2})^x$

d. Use your equation to find the 10th term.

$f(10) = 384(\frac{1}{2})^{10}$

$= 0.375$

Describe how you can tell the difference between an **arithmetic** and a **geometric** sequence by looking at its....

	Arithmetic	Geometric
1) Table:	Add or subtract the same #	Multiply by the same #
2) Graph:	line 	curve 
3) Equation:	$y = mx + b$	$y = a \cdot b^x$