NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set

For each problem, write the corresponding "*a* sub" or function notation.

Meaning	"*a* sub" Notation	Function Notation
1. 7^{th} term of the sequence	a_7	$f(7)$
2. 10^{th} term of the sequence	a_{10}	$f(10)$
3. 1^{st} term of the sequence added to the 2^{nd} term of the sequence	$a_1 + a_2$	$f(1) + f(2)$
4. n^{th} term of the sequence	a_n	$f(n)$
5. The n^{th} term subtracted from the $(n-1)^{th}$ term of the sequence	$a_{n-1} - a_n$	$f(n-1) - f(n)$

6. Consider a sequence generated by the formula $f(n) = 6n - 4$ starting with $n = 1$. Generate the terms $f(1)$, $f(2)$, $f(3)$, $f(4)$, and $f(5)$.

$f(n) = 6n - 4$

$f(1) = 6(1) - 4$
$f(1) = 6 - 4$
$f(1) = 2$

$f(2) = 6(2) - 4$
$f(2) = 12 - 4$
$f(2) = 8$

$f(3) = 6(3) - 4$
$f(3) = 18 - 4$
$f(3) = 14$

$f(4) = 6(4) - 4$
$f(4) = 24 - 4$
$f(4) = 20$

$f(5) = 6(5) - 4$
$f(5) = 30 - 4$
$f(5) = 26$

7. Consider a sequence given by the formula $f(n) = \frac{1}{3^{n-1}}$ starting with $n = 1$. Generate the first 5 terms of the sequence. Remember $a^0 = 1$ as long as $a \neq 0$.

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

$f(1) = \frac{1}{3^{1-1}} = \frac{1}{3^0} = \frac{1}{1}$
$f(1) = 1$

$f(2) = \frac{1}{3^{2-1}} = \frac{1}{3}$
$f(2) = \frac{1}{3}$

$f(3) = \frac{1}{3^{3-1}} = \frac{1}{3^2} = \frac{1}{9}$
$f(3) = \frac{1}{9}$

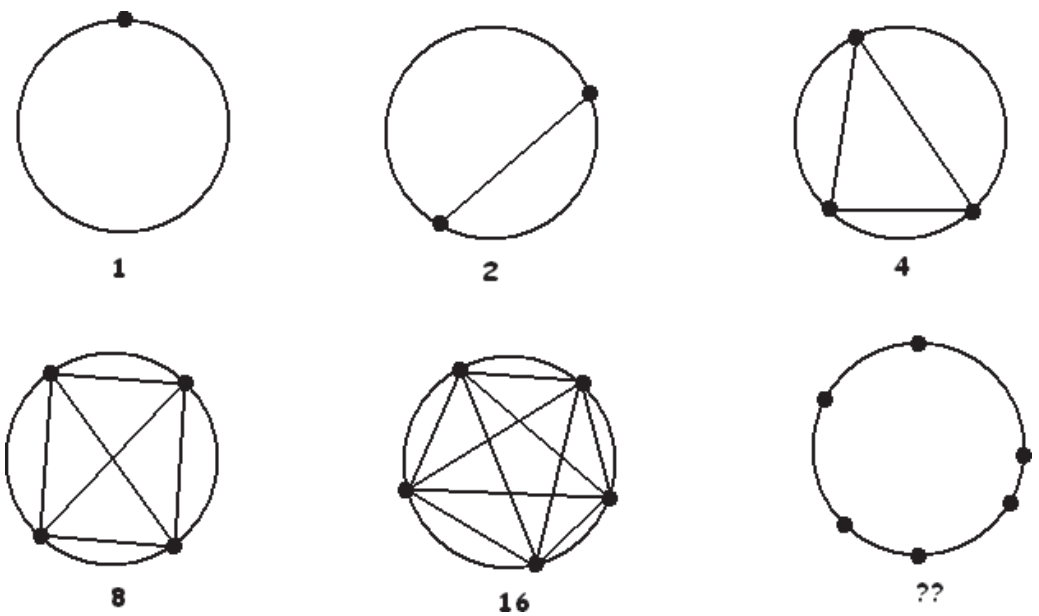
$f(4) = \frac{1}{3^{4-1}} = \frac{1}{3^3} = \frac{1}{27}$
$f(4) = \frac{1}{27}$

$f(5) = \frac{1}{3^{5-1}} = \frac{1}{3^4} = \frac{1}{81}$
$f(5) = \frac{1}{81}$

8. Consider a sequence given by the formula $f(n) = (-1)^n \times 3$ starting with $n = 1$. Generate the first 5 terms of the sequence.

f(1)= -3
f(2)= 3
f(3)= -3
f(4)= 3
f(5)= -3

9. **Challenge** Here is the classic puzzle that shows that patterns need **not** hold true. What are the numbers counting?



A. Based on the sequence of numbers, predict the next number.

32 1, 2, 4, 8, 16, 32

B. Write a formula based on the pattern.

$f(n) = 2^{n-1}$ for n=1

C. Find the next number in the sequence by actually counting.

31

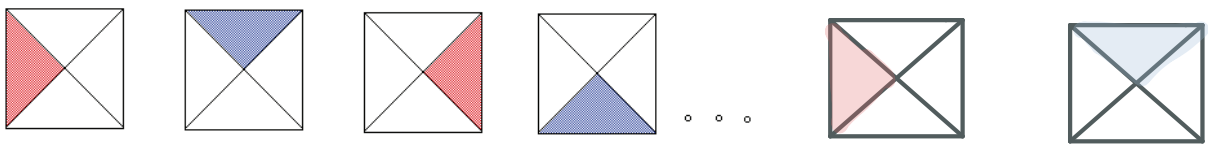
D. Based on your answer from Part C, is your model from Part B effective for this puzzle?

No, it doesn't work.

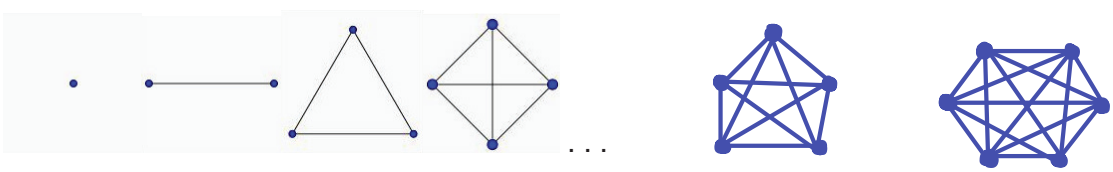
Sequences That Aren't Numbers

For each sequence below, write the next two terms and explain in words how the pattern continues.

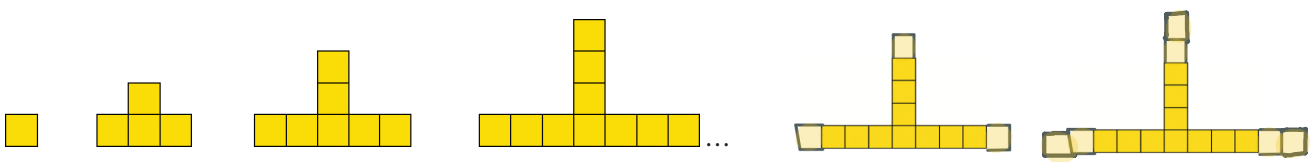
10.



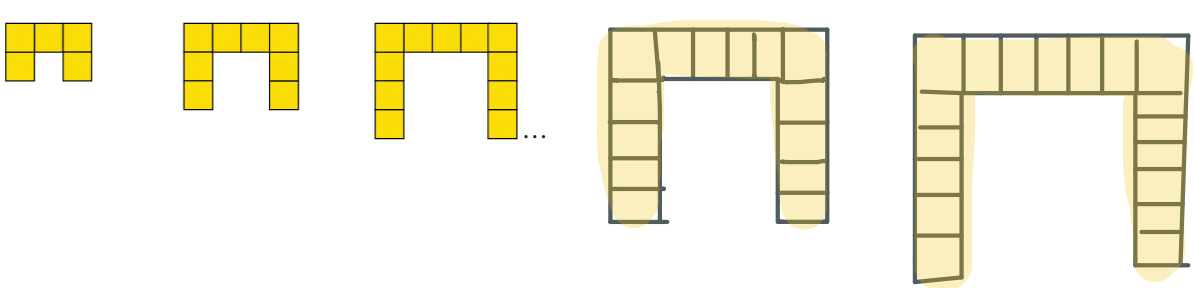
11.



12.



13.



14.

a a b c a a b c a a b c a...

aabc ← repeating

15. **Challenge** **O, T, T, F, F, S, S, E, . . .**

First letter of each counting word.

16. **Challenge** **M, T, W, T, . . .**

First Letter of each day

17. The Lesson Summary Example 2 stated:

Mrs. Rosenblatt gave her students what she thought was a very simple task: What is the next number in the sequence 2, 4, 6, 8, . . .?

Cody: *I am thinking of a plus 2 pattern, so it continues* 10, 12, 14, 16, ...

Ali: *I am thinking of a repeating pattern, so it continues* 2, 4, 6, 8, 2, 4, 6, 8, ...

Suri: *I am thinking of the units digits in the multiples of two, so it continues* 2, 4, 6, 8, 0, 2, 4, 6, 8, ...

A. Are each of these valid responses? Explain your thinking.

yes, they all follow a pattern.

B. What is the hundredth number in the sequence in Cody's scenario? Ali's? Suri's?

Cody: 200 Ali: 8 Suri: 0

C. What is an explicit formula for the n^{th} number in the sequence in Cody's scenario?

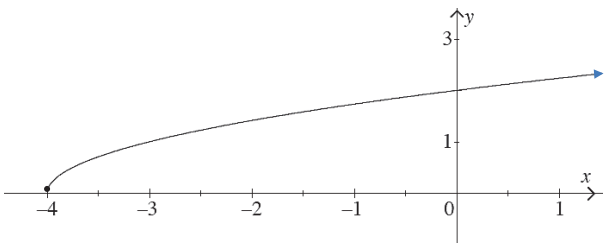
$f(n) = 2n$

Spiral REVIEW—Domain and Range

For Problems 18–21, determine the domain and range for each graph shown.

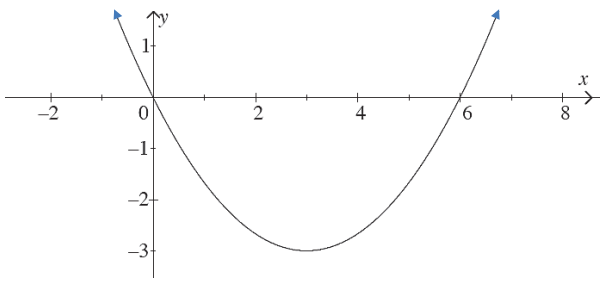
18. Domain: $[-4, \infty)$

Range: $[0, \infty)$



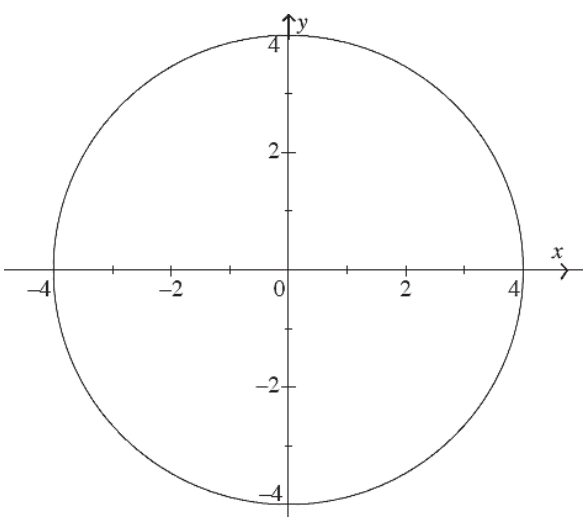
19. Domain: $(-\infty, \infty)$

Range: $[-3, \infty)$



20. Domain: $[-4, 4]$

Range: $[-4, 4]$



21. Domain: $[0, 2]$

Range: $[0, 4]$