**Algebra 1 CC**
**Assignment #43**
**Introduction to Sequences**

1. Consider the sequence below. If we represent this sequence with the letter *a* then do the following.

**1, 7, 13, 19, 25, 31, 37, 43**

(a) Find $a(5)$

(b) Find $a_2 + a_6$

(c) Find $a(4) + 2a(6)$

(d) Find $\sqrt{a(5)}$

(e) Find $\dfrac{a(5) - a(3)}{2}$

(f) Find a recursive definition for the sequence $a(n)$.

2. Consider the sequence defined in the table below.

| $n$ | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| $b(n)$ | 2 | 12 | 22 | 32 | 42 |

(a) Find $b(4)$

(b) Find $\dfrac{2b(2) - b(3)}{4}$

(c) Find a recursive definition for the sequence $b(n)$.

3. Consider a sequence of numbers given by the definition $c_1 = 2$ and $c_i = c_{i-1} \cdot 3$

(a) Write out the first 4 terms of this sequence.

(b) Find the value of $c_4 - c_2$. Show your calculation.

4. A sequence is defined recursively as follows:

$a(1) = 1$, and $a(n) = a(n-1) + n$

(a) How do you interpret this recursive rule? Write it down in your own words.
(b) Write down the rule for $a(2), a(3),$ and $a(4)$ and determine their values.

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R1. The temperature is falling outside at a steady rate of 4 degrees Fahrenheit every hour. If the temperature starts at 68 Fahrenheit do the following.

(a) Fill out the table below for the outside temperature during the time it is cooling down.

| Time Cooling, *t*, (hours) | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| Temperature, *F*, (Fahrenheit) | | | | |

(b) Write a linear equation that relates the Fahrenheit temperature, *F*, to the time in hours, *t*, that it has been falling.

(c) According to your equation, what is the temperature when $t = 2.75$ hours?

(d) If this cooling continues at this constant rate, how many hours will it take for the temperature to reach the freezing point of water? Show your work.

R2. Identify the slope of the following lines:

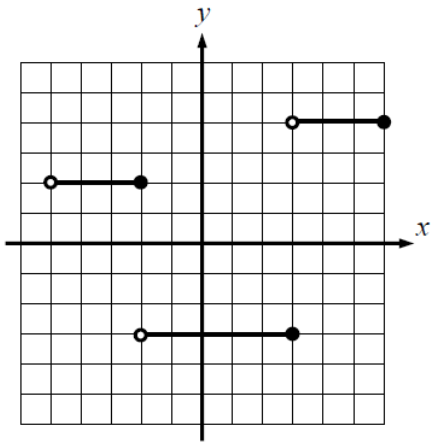
a. $2y = 4x + 5$

b. $4y + 6x = 0$

c. $y = 4$

d. $x = -2$

R3. The step function g(x) is shown on the grid below.




(a) Evaluate each of the following:

f(-4) = f(-2) =

f(2) = f(5) =

(b) Jack states that the range of this function is $-3 \le y \le 4$.

Is he correct? Why or why not.

(c) Write an equation for this step function.

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1. (a) 25
   (b) 38
   (c) 81
   (d) 5
   (e) 6
   (f) $a(1) = 7$, $a(n) = a(n-1) + 6$

2. (a) 32
   (b) $\frac{1}{2}$
   (c) $b(1) = 2$, $b(n) = b(n-1) + 10$

3. (a) 2, 6, 18, 54
   (b) 48

4. (a) Get each term by adding its ordinal number (place in line) to the term before it.

   (b) $a(2) = 1 + 2 = 3$
   $a(3) = 3 + 3 = 6$
   $a(4) = 6 + 4 = 10$

R1. (a) 68, 64, 60, 56
   (b) $F = -4t + 68$
   (c) 57°F
   (d) 9 hours

R2. a. $m = 2$
   b. $m = -\frac{3}{2}$
   c. $m = 0$
   d. *undefined*

R3. (a) f(-4) = 2
   f(-2) = 2
   f(2) = -3
   f(5) = 4

(b) No. It is not a continuous function. It is a step function whose range is {-3, 2, 4}

(c) $f(x) = \begin{cases} 2 & -5 < x \le -2 \\ -3 & -2 < x \le 3 \\ 4 & 3 < x \le 6 \end{cases}$