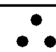
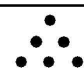
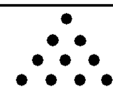
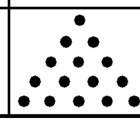
Name: ____ Date: __________________________

CC Algebra

Recusive Sequence - Day 2

1) The table below represents the first 5 triangular numbers in a sequence graphically.

Figure in the Series	Triangular Number	Diagram
1st	1	
2nd	3	
3rd	6	
4th	10	
5th	15	

Part A

Write a recursive definition for finding the n^{th} term of this sequence.

Answer: ____________________

Part B

Use the definition written for Part A to determine the number of dots needed to form the 10th figure in the sequence?

Show your work.

Answer: __________ dots

2) Tyler gets a starting salary of $22,600, with annual raises of $800.

Part A

Write an explicit formula to model Tyler's salary after n years of employment when $n \geq 1$.

Answer: ________________________

Part B

Write an equivalent recursive definition for representing Tyler's salary.

Answer: ________________________

Part C

What will his salary be during his fourth year on the job?

Show your work.

Answer: $______________

3) Determine the first three terms of the given sequence using the recursive rule:

$f(1) = 5$ and $f(n + 1) = f(n)^{-2} - 1$

Show your work.

Answer: ______________

4) Given the sequence defined by the explicit formula $f(n) = 9 - 2(n - 1)$, where $n \geq 1$.

Part A

State the first 4 terms of this sequence.

Show your work.

Answer: _______________

Part B

Rewrite the formula for this sequence using an equivalent recursive definition.

Show your work.

Answer: ______________________________

5) Find the third term in the recursive sequence $f(k + 1) = 2f(k) - 1$, where $f(1) = 3$.

Show your work.

Answer: __________

6) Find the first four terms of the recursive sequence defined below.

$f(1) = -3$
$f(n) = f(n - 1) - n$

Show your work.

Answer: _______________

7) When Myra started college, tuition was $8,240 per semester. Each year, the tuition per semester increased by $400.

Part A

Write an explicit formula to model the semester tuition cost after n years when $n \geq 1$.

Answer: _________________________

Part B

Write an equivalent recursive definition to represent the semester tuition cost.

Answer: _________________________

Part C

What was the cost of tuition per semester during her fourth year at college?

Show your work.

Answer: $_______________

1) Part A: f(1) = 1, f(n + 1) = f(n) + n
Part B: 55 dots
WORK SHOWN: f(6) = f(5) + 6 = 21, f(7) = f(6) + 7 = 28, f(8) = f(7) + 8 = 36, f(9) = f(8) + 9 = 45, f(10) = f(9) + 10 = 55

2) Part A: S(n) = 22,600 + 800(n − 1);
Part B: S(1) = 22,600 and S(n + 1) = 800 + S(n);
Part C: $25,000
WORK SHOWN: S(4) = 22,600 + 800(3) = 25,000

3) $5, -\frac{24}{25}, \frac{49}{576}$

4) Part A: 9, 7, 5, 3
WORK SHOWN: f(1) = 9 − 2(1 − 1) = **9**, f(2) = 9 − 2(2 − 1) = **7**, f(3) = 9 − 2(3 − 1) = **5**, f(4) = 9 − 2(4 − 1) = **3**;
Part B: f(1) = 9 and f(n + 1) = f(n) − 2, $n \geq 1$
WORK SHOWN: Arithmetic Sequence: a = f(1) = 9, d = 7 − 9 = -2; f(n + 1) = f(n) − 2

5) f(3) = 9
WORK SHOWN: f(k + 1) = 2f(k) − 1 and f(1) = 3; f(2) = 2f(1) − 1 = 2(3) − 1 = 5, f(3) = 2f(2) − 1 = 2(5) − 1 = 9

6) -3, -5, -8, -12
WORK SHOWN: f(1) = **-3** and f(n) = f(n − 1) − n; f(1) = f(2 − 1) − 2 = -3 − 2 = **-5**, f(3) = f(3 − 1) − 3 = -5 − 3 = **-8**, f(4) = f(4 − 1) − 4 = -8 − 4 = **-12**

7) Part A: T(n) = 8,240 + 400(n − 1);
Part B: S(1) = 8,240 and S(n + 1) = 400 + S(n);
Part C: $9,440
WORK SHOWN: S(4) = 8,240 + 400(3) = 9,440