

Definitions:

An Arithmetic Sequence whose terms is a set of consecutive integers and number is the outcome of Common Difference..

Common Difference (d): Where each value is an outcome be either adding or subtracting the same amount to find the next value.

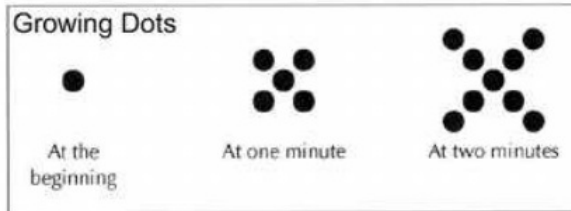
Recursive Formula: Starting point then skip counts to find the next term.

Explicit Formula: go straight to the answer.

Arithmetic Sequence Formulas:

Recursive: $f(0) = \underline{\hspace{2cm}}$, $f(x+1) = f(x) + \underline{d}$

Explicit: $f(x) = \underline{a} + \underline{xd}$



- Describe the pattern of change you see in the above sequence of figures.
- Assuming the sequence continues in the same way, how many dots are there at 3 minutes? At 4 minutes? At 5 minutes? Make a table and graph for the data.

Time	Pattern	# Dots
0	1	1
1	1 + 4	5
2	1 + 4 + 4	9
3	1 + 4 + 4 + 4	13
4	1 + 4 + 4 + 4 + 4	17
5	1 + 4 + 4 + 4 + 4 + 4	21



This pattern of dots can be written as an arithmetic sequence:

$a_0, a_1, a_2, a_3, a_4, \dots$

- Write a recursive formula to describe how many dots there will be after t minutes?

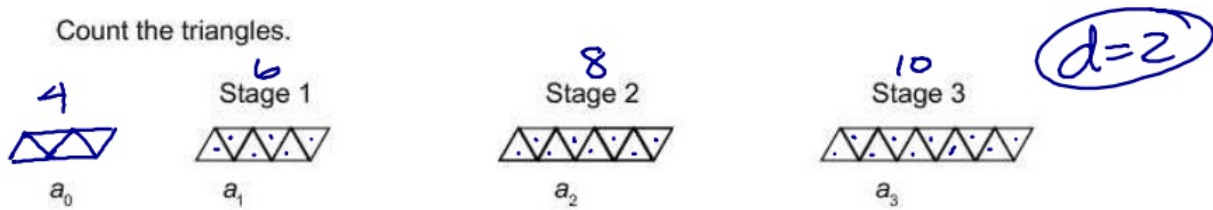
$f(0) = 1$
 $f(x+1) = f(x) + 4$

- Write an explicit formula to describe how many dots there will be after t minutes?

$f(x) = f(0) + x(4)$

Picture Patterns

Count the triangles.



- a) Write a recursive formula and an explicit formula for the number of triangles in each stage.

Recursive $f(0) = 4$
 $f(x+1) = f(x) + 2$

Explicit $f(x) = 4 + x(2)$
 $= 2x + 4$

- b) How many triangles will there be in the 12th stage? 35th stage?

$f(12) = 4 + 12(2)$
 $= 28$

$f(35) = 4 + 35(2)$
 $= 4 + 70$
 $= 74$

- c) If there are 88 triangles, what stage is represented?

$f(?) = 88$

$$\begin{array}{r} 88 = 4 + x(2) \\ -4 \quad -4 \\ \hline 84 = x(2) \\ 42 = x \end{array}$$

42nd Stage

Number Patterns

Given the first four numbers in each arithmetic sequence write a recursive and explicit formula:

- a) a_0 39, a_1 42, a_2 45, a_3 48, ...

Recursive $f(0) = 39$
 $f(x+1) = f(x) + 3$

Explicit $f(x) = 39 + x(3)$

- b) -22, -32, -42, -52, ...

Recursive $f(0) = -22$
 $f(x+1) = f(x) - 10$

Explicit $f(x) = -22 + x(-10)$

- c) 2, 8, 14, 20, ...

Recursive $f(0) = 2$
 $f(x+1) = f(x) + 6$

Explicit $f(x) = 2 + x(6)$

- d) 7, 0, -7, -14, ...

Recursive $f(0) = 7$
 $f(x+1) = f(x) - 7$

Explicit $f(x) = 7 + x(-7)$

Mr. Wallace has a candy machine like the ones you see at grocery stores. Each time a student inserts a quarter, about 10 candies come out of the machine. The machine holds 5 pounds of candy. Each pound of candy contains about 180 individual candies.

1. Represent the number of candies in the machine for any given number of students. About how many students will there be before the machine is empty?

2. Represent the amount of money in the machine for any given number of students.

3. To avoid theft, Mr. Wallace doesn't want to let too much money collect in the machine, so he takes all the money out when he thinks the machine has about \$5 in it. The tricky part is that he can't tell how much money is actually in the machine without opening it up, so he chooses when to remove the money by judging how many candies are left in the machine. About how full should the machine look when he takes the money out?

# students	0	1	2	3	4	
\$ in machine	\$0	\$.25	\$.50			\$5.00
# candies in machine						

4. Write a recursive formula and an explicit formula to represent the number of candies in the machine.

Recursive

Explicit

Given the first four numbers in each arithmetic sequence write a recursive and explicit formula:

5. 5, 12, 19, 26

Recursive

Explicit

6. 11, 1, -9, -19

Recursive

Explicit

7. 10, 7.5, 5, 2.5

Recursive

Explicit

8. $2\frac{2}{3}$, 3, $3\frac{1}{3}$, $3\frac{2}{3}$

Recursive

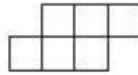
Explicit

Count the squares in the stair-step.

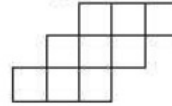
Stage 1



Stage 2



Stage 3



9. Write a recursive formula and an explicit formula for the number of squares in each stage.

Recursive

Explicit

10. How many squares will there be in the 10th stage? 18th stage?

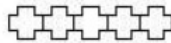
11. If there are 63 squares, what stage is represented?

Count the plus signs.

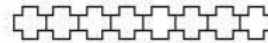
Stage 1



Stage 2



Stage 3



12. Write a recursive formula and an explicit formula for the number of plus signs in each stage.

Recursive

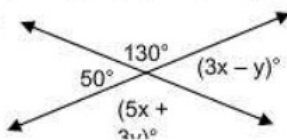
Explicit

13. How many plus signs will there be in the 15th stage? 21st stage?

14. If there are 149 plus signs, what stage is represented?

Review. Solve for x and y .

15.



16.

