

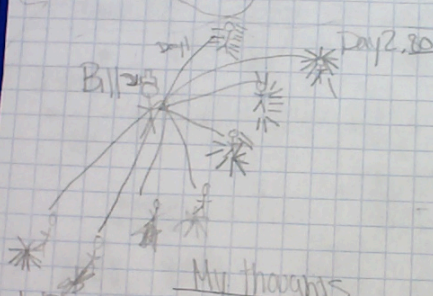
Arithmetic/Geometric pattern
 • Constant Rate of Change or difference

$$f(x) = 3 + 2(x-1)$$

$$y = 2x + 1$$

Geometric Pattern: $\frac{y}{x} =$
 Changes: Constant Ratio
 Recursive: Next - Previous \times
 Explicit: $a \cdot r^{(n-1)}$

input	output
Days	Pushups
1	$f(1) = 3$
2	$f(2) = 5$
3	$f(3) = 7$
4	$f(4) = 9$
10	$f(10) = 21$
10	$3 + 2(10) = 21$
10	$f(n) = 3 + 2(n-1)$
10	$x + k = 2x + 1$



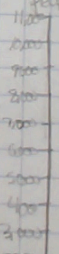
Days	People	Process	9-2-15
1	2x10	8x10 ⁹	15
2	50	8x10 ⁹	
3	800	8x10 ⁹	
4	8000	8x10 ⁹	
7	800000	8x10 ⁹	

$$y = 810x^{-1}$$

Recursive - next - previous $\times 10$

$$f(x) = 810x^{-1}$$

- My thoughts
1. Day 7
 2. Explicit Equation (make table, find pattern)
 3. Recursive
 4. If \$4.95 = ice cream after 1 week, how much will it cost Bill?
 5. Make a graph.



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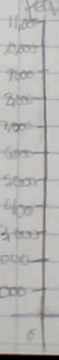
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Recursive function

Recursive idea = Next = Previous * 10

Change to function notation

Day	Process	Recursive function
1	$f(1) = 8$	$f(1) = 8$ - starting point
2	$f(2) = 80$	$f(2) = f(1) \cdot 10 = 80$
3	$f(3) = 800$	$f(3) = f(2) \cdot 10 = 800$
4	$f(4) = 8000$	$f(4) = f(3) \cdot 10 = 8000$
5		
100	$8 \cdot 10^{99}$	$f(100) = f(99) \cdot 10$
X		$f(x) = f(x-1) \cdot 10$

Recursive function:

$f(1) = 8$
 $f(x) = f(x-1) \cdot 10$

Recursive function 3, 5, 7, 9

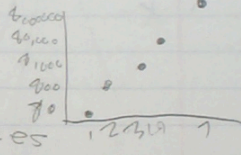
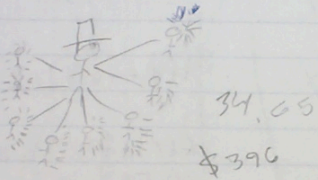
Day	Process	Recursive function
1	$f(1) = 3$	$f(1) = 3 = 3$
2	$f(2) = 5$	$f(2) = f(1) + 2 = 5$
3	$f(3) = 7$	$f(3) = f(2) + 2 = 7$
4	$f(4) = 9$	$f(4) = f(3) + 2 = 9$
X		$f(x) = f(x-1) + 2$ $f(1) = 3$

Arithmetic

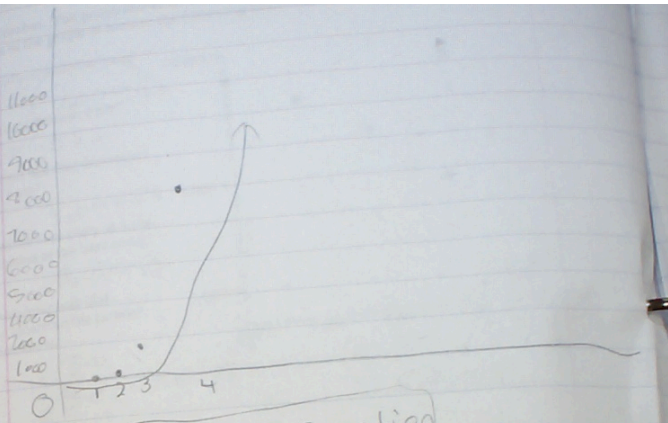
Pattern +
 Change: constant difference
 Recursive: next equals previous +

Geometric

Pattern $\times / =$
 Change
 Recursive: next = previous \times



Days that grows	People	Process
1	80	$80(10^0)$
2	800	$8(10^1, 10^0)$
3	8000	$8(10 \times 10 \times 10)$
4	80000	$8(10 \times 10 \times 10 \times 10)$
5		
6		
7	8,000,000	$8(10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10)$



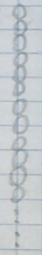
Recursive function

Day	People	Recursive Idea
1	$f(1) = 8$	Next = Previous $\times 10$
2	$f(2) = 80$	Change to function
3	$f(3) = 800$	Notation $f(2) = f(1) \cdot 10$
4	$f(4) = 8000$	$f(3) = f(2) \cdot 10$
5	$f(5) = 80000$	$f(4) = f(3) \cdot 10$
	100	$f(100) = f(99) \cdot 10$
X		$8 \cdot 10^{x-1}$ $f(x) = f(x-1) \cdot 10$

Day	People	Recursive function
1	3	$f(1) = 3$
2	5	$f(2) = f(1) + 2$
3	7	$f(3) = f(2) + 2$
4	9	$f(4) = f(3) + 2$
X		$f(x) = f(x-1) + 2$ $f(1) = 3$

8 friends: an/my Thoughts

- 0 → 10 people
- 0 → 10 people
- 0 → 10 people
- 0 → 10 people → 20 friends
- 0 → 10 people
- 0 → 10 people
- 0 → 10 people
- 0 → 10 people



1. So day 1, 8 people have it then 20 then 800

x	y	process
1	8	8 x 1
2	20	8 x 10
3	800	8 x 100

$y = 8 * 10^x$ so $8 * 10^7 = 80000000$

2. $f(x) = 8(10^x)$
or
 $f(x) = 80^x$

3. previous times 10 times 8

4. 500A

5. $(8 * 10^x) * 4.95 = \text{money spent}$

day 7 = \$396,000,000

1. So day 1, 8 people have it then 20 then 800

x	y	process
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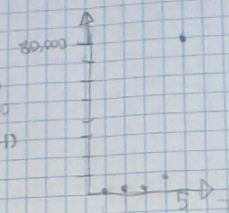
4. 500A

5. $(8 * 10^x) * 4.95 = \text{money spent}$

day 7 = \$396,000,000



day	people	process
1	8	$8 \cdot 10^0$
2	80	$8 \cdot 10^1$
3	800	$8 \cdot 10^2$
4	8000	$8 \cdot 10^3$
5	80000	$8 \cdot 10^4$
6	800000	$8 \cdot 10^5$
7	8000000	$8 \cdot 10^6$
n		$8 \cdot 10^{(n-1)}$



$$f(n) = 8 \cdot 10^{(n-1)}$$

Recursive Function starting #

term	sequence	recursive function
1	8	$f(1) = 8$
2	80	$f(2) = f(1) \times 10$
3	800	$f(3) = f(2) \times 10$
4	8000	$f(4) = f(3) \times 10$
5	80000	$f(5) = f(4) \times 10$
6	800000	$f(6) = f(5) \times 10$
7	8000000	$f(7) = f(6) \times 10$
n	$8 \cdot 10^{n-1}$	$f(n) = f(n-1) \times 10$

Use Function
 Next = previous $\times 10$
 $f(1) = 8$ constant / ratio
 $f(n) = f(n-1) \times 10$

term	sequence	process	recursive
1	3	3+0	$f(1) = 3$
2	5	3+2	$f(2) = f(1) + 2$
3	7	3+2+2	$f(3) = f(2) + 2$
n		3+2+2+2	$f(n) = f(n-1) + 2$

$f(1) = 3$ constant / difference
 $f(x) = f(x-1) + 2$

Sequence: list of numbers with a pattern

Example: 2, 5, 7, 11, ...

Next = Previous $\pm / \times / \div n$

4	$5(4) = 9$
5	$5(5) = 11$
50	$5(50) = 3 + 2(49) = 101$

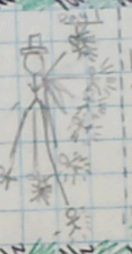
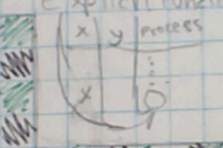
Arithmetic sequence: adding/subtracting
 Example: 1, 5, 9, 13, ...

Change: constant difference

Sequence

Geometric: $f(n) = r \cdot f(n-1)$ Recursive: $N \cdot P^{n-1}$
 Change: constant ratio Explicit Function

RECURSIVE FUNCTION



Day	people	process	Recursive
1	8	$8 \cdot 10^0$	$f(1) = 8$
2	80	$8 \cdot 10^1$	$f(2) = f(1) \times 10$
3	800	$8 \cdot 10^2$	$f(3) = f(2) \times 10$
4	8000	$8 \cdot 10^3$	$f(4) = f(3) \times 10$
5	80000	$8 \cdot 10^4$	$f(5) = f(4) \times 10$
6	800000	$8 \cdot 10^5$	$f(6) = f(5) \times 10$
7	8000000	$8 \cdot 10^6$	$f(7) = f(6) \times 10$
n		$8 \cdot 10^{n-1}$	$f(n) = f(n-1) \times 10$

1	$f(1) = 8$	$f(2) = 8 \cdot 10$
2	$f(2) = 80$	$f(3) = 80 \cdot 10$
3	$f(3) = 800$	$f(4) = 800 \cdot 10$
4	$f(4) = 8000$	$f(5) = 8000 \cdot 10$
100	$8 \cdot 10^{99}$	$f(100) = 8 \cdot 10^{99}$
		$f(x) = f(x-1) \cdot 10$

Recursive:
 $f(1) = 8$
 $f(x) = f(x-1) \cdot 10$

x	y	process	Recursive
1	3		$f(1) = 3$
2	5		$f(2) = f(1) + 2 = 5$
3	7		$f(3) = f(2) + 2 = 7$
4	9		$f(4) = f(3) + 2 = 9$
			$f(x) = f(x-1) + 2$

$f(x) = f(x-1) + 2$

e: list of numbers with a pattern
 adding/subtracting
 Change: constant difference

Next=Previous
 $+/-/x/\%n$
 $f(1)=1$
 $f(2)=3+2(1)=5$

My Thoughts

day	people	process
1	8	8
2	80	$8 \cdot 10$
3	800	$8 \cdot 10^2$
4	8000	$8 \cdot 10^3$
5	80000	$8 \cdot 10^4$
6	800000	$8 \cdot 10^5$
7	8000000	$8 \cdot 10^6$
8	80000000	$8 \cdot 10^7$

Recursive: NP%
 Explicit Function
 x y process

Recursive function recursive iden
 next=previous

x	y process	Recursive
1	$f(1)=3$	$f(1)=3$
2	$f(2)=5$	$f(2)=f(1)+2=5$
3	$f(3)=7$	$f(3)=f(2)+2=7$
4	$f(4)=9$	$f(4)=f(3)+2=9$

Recursive:
 $f(1)=8$
 $f(x)=f(x-1) \cdot 10$
 0
 -10

$f(x)=f(x-1)+2$