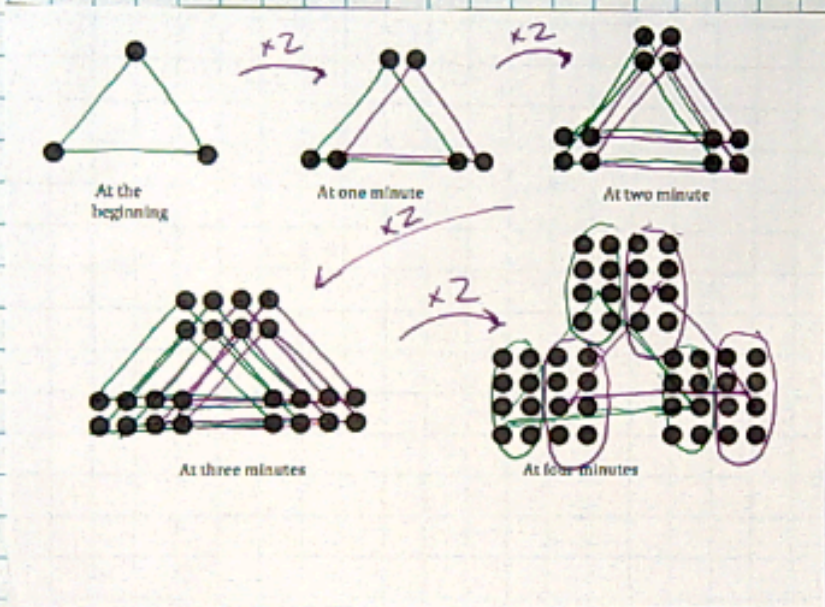


1.3 Growing, Growing Dots

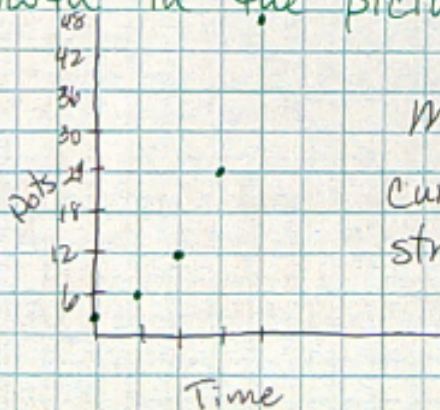
Learning Targets:

Identify rates of growth:
 constant difference and constant ratio
 Write recursive functions.
 Write explicit functions.



Make models of the pattern.
 Show the growth in the picture.

n	f(n)
0	3 (2)
1	6 (2)
2	12 (2)
3	24 (2)
4	48 (2)



Makes a
 curve, not a
 straight line.

Recursive Function

n	f(n)	Recursive Pattern
0	3	$f(0) = 3$
1	6	$f(1) = f(0) \cdot 2$
2	12	$f(2) = f(1) \cdot 2$
3	24	$f(3) = f(2) \cdot 2$
4	48	$f(4) = f(3) \cdot 2$
...		
10		$f(10) = f(9) \cdot 2$
...		
n-1		$f(n-1)$
n		$f(n) = f(n-1) \cdot 2$

Constant ratio -
the number that
is multiplied
over and over in
a sequence.

Recursive Function for any n

$$f(n) = f(n-1) \cdot 2, \quad f(0) = 3$$

Next \rightarrow \uparrow Previous \downarrow constant ratio \leftarrow first number in sequence

Explicit Function

n	f(n)	Expansion
0	3	$f(0) = 3$
1	6	$f(1) = 3 \cdot 2$
2	12	$f(2) = 3 \cdot 2 \cdot 2$
3	24	$f(3) = 3 \cdot 2^3$
4	48	$f(4) = 3 \cdot 2^4$
...		
7		$f(7) = 3 \cdot 2^7$
10		$f(10) = 3 \cdot 2^{10}$
...		
n		$f(n) = 3 \cdot 2^n$

We can find the value
of any term using
this function.

Explicit \uparrow