1.6 Don't Break the Chain

Learning Target:

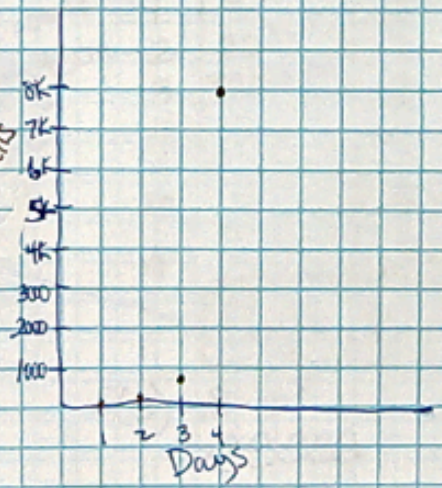
- Identify Geometric Sequences
- Write recursive and explicit functions for geometric sequences. (Starting with the 1st term)

On day 1, Bill sends out an email to his 8 closest friends. On day 2, they each send the email to 10 friends so 80 people receive the email. How many will receive the email on day 7?

Make a table!

n	f(n)
1	8
2	80
3	800
4	8000
5	80,000
6	800,000
7	8,000,000

(×10) (×10) (×10) (×10) (×10) (×10)



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

Explicit:

n	f(n)	Expansion
1	8	$8 = 8 \cdot 10^0$
2	80	$8 \cdot 10 = 8 \cdot 10^1$
3	800	$8 \cdot 10 \cdot 10 = 8 \cdot 10^2$
4	8000	$8 \cdot 10^3$
5	80,000	$8 \cdot 10^4$
⋮		
10		$8 \cdot 10^9$
⋮		
n		$8 \cdot 10^{n-1}$

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

What would the 0th term be?

or what if we did this...

		Expansion
0	.8 ÷10	$.8$
1	8 (10)	$.8 \cdot 10$
2	80 (10)	$.8 \cdot 10 \cdot 10$
3	800 (10)	$.8 \cdot 10^3$
4		$.8 \cdot 10^4$
⋮		
10		$.8 \cdot 10^{10}$
⋮		
n		$.8 \cdot 10^n$

$$f(n) = .8 \cdot 10^n$$

Both of these equations work.

$f(5) = 8 \cdot 10^{5-1}$
$= 8 \cdot 10^4 = 80{,}000$

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

$f(5) = .8 \cdot 10^5$
$= .80000$
$= 80{,}000$

$f(n) = .8 \cdot 10^n$ ⓪
.8 = 0th term
? = ⓪