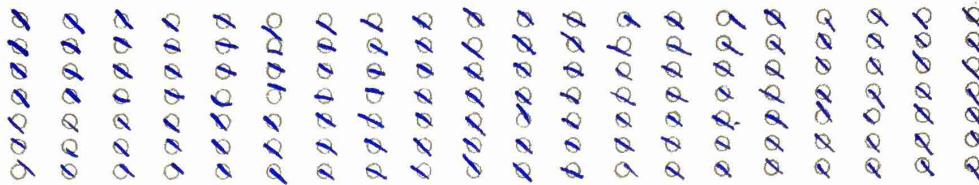


# How long until the zombies take over?



On the TV show The Walking Dead, a disease was contracted that turns people into zombies or Walkers. If the Walkers bite a human, the human is turned in to a Walker. Assume that the each Walker turns one person a week into a zombie and that none of the Walkers are killed.

- The diagram below represents a town with 140 people. Each circle represents a human; each crossed out circle represents a Walker. Keep track of the human and Walker populations over time.



Weeks	0	1	2	3	4	5	6	7	8	9	10
Walkers	1	2	4	8	16	32	64	128	140	140	140
Humans	139	138	136	132	124	108	76	12	0	0	0

- How does the Walker population change each week, and how long will it take before everyone in town is a Walker?

*It doubles each week. It takes between 7 & 8 weeks.*

- Try to write a function that gives the number of Walkers as a function of the number of weeks that have passed.

$$y = 2^x$$

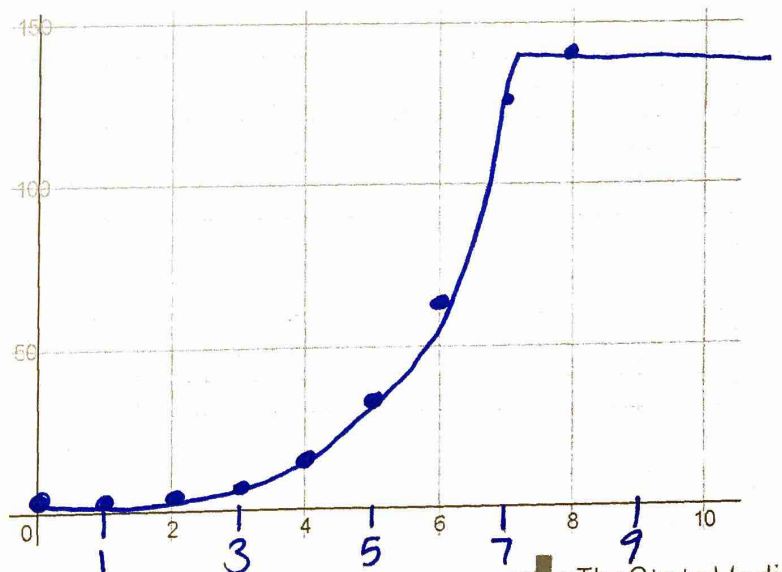
- Graph the function:

Domain:

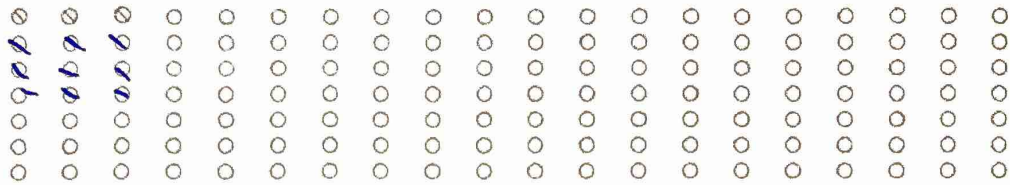
$$0 \leq x \leq 8$$

Range:

$$1 \leq y \leq 140$$



2. A different town of 140 started with 3 Walkers. Complete the table below.



Weeks	0	1	2	3	4	5	6	7	8	9	10
Walkers	3	6	12	24	48	96	140				
Humans	137	134	128	116	92	44	0				

a. How long will it take for everyone in that town to be a Walker?

Between 5 & 6 weeks.

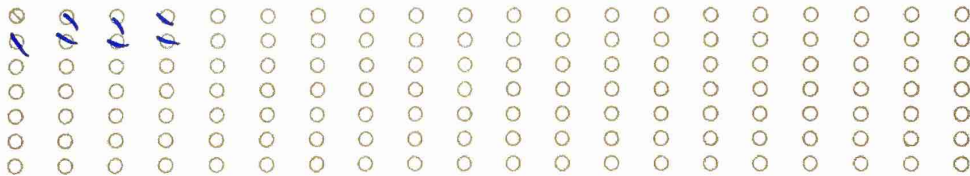
b. Write a function to describe the table. How is it different from your answer to 1b?

$y = 3 \times 2^x$  We take the function in 1 and triple it.

c. If you graphed the equation, how would the graph change from 1c?

Vertical stretch of 3

3. In a different town of 140, the Walker is trapped for the first two weeks so it is not able to bite any humans. On week 3, it gets out. Track the population below.



Weeks	0	1	2	3	4	5	6	7	8	9	10
Walkers	1	1	1	2	4	8	16	32	64	128	140
Humans	139	139	138	136	132	124	108	76	12	0	

a. Write a function to describe the table. How is it different from your answer to 1b?

The pattern starts two spaces later so we use  $y = 2^{(x-2)}$

b. If you graphed the equation, how would the graph change from 1c?

We shift it 2 to the right.

c. During week 4, Rick comes to town. He kills 1 Walker a day. Write an equation to describe this relationship. Can he save the town?

$$\text{Rick} = 2^{(x-2)} - 7(x-4)$$

Yes he can. In week 4 there are 4 walkers so if he kills 1 a day he can get them all. TheStatsMedic