

3. [12 points] A zombie plague has broken out in Ann Arbor. As a nurse in the University of Michigan hospital, you saw the person with the first case of the plague, patient zero.

a. [2 points] In order to keep track of the growing zombie population in Ann Arbor, you collected the following data:

Days after patient zero	0	6	9	12
Number of Zombies	1	9	27	81

Would a linear function or an exponential function be the best model? Why?

b. [4 points] Write a function  $Z(t)$  of the appropriate type to model the growth of the zombie population with  $t$  measured in days after patient zero.

c. [3 points] The population of North America is approximately 530,000,000 people. Using your model, how long will it take until all but one person are infected?

d. [3 points] Using your table, approximate the instantaneous rate of change of the zombie population on the ninth day.