Shields | Fort Vancouver High School

Winter Break Extra Credit Name: _____

Zombie Dogs Attack

You may use a calculator all you want, except on #3. Explain your process to receive full credit.

An pack of zombie dogs (ZDs) is reproducing quickly and killing humans. Scientists and calculus students have determined that the the total number of human deaths due to ZDs *t* days after the start of 2010 is given by

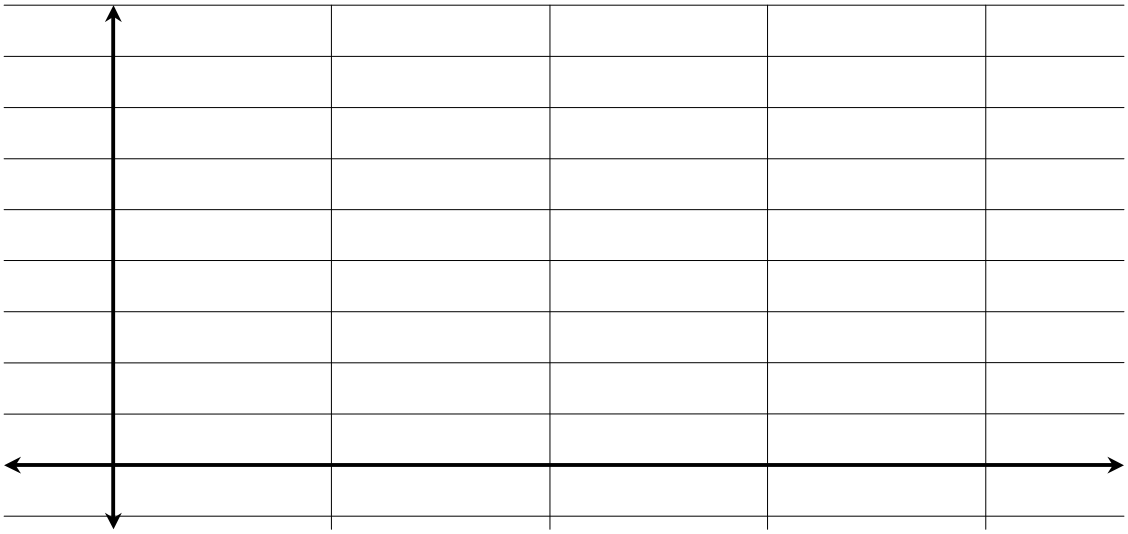
$$h(t) = \frac{6.8 \cdot 10^9}{1 + (t+2)e^{21-0.6t}}$$

1. At the end of January 1st (t = 1), how many deaths have occurred?

2. At the end of January, how many deaths will have occurred?

3. Determine the number of deaths/day after t days: h'(t).
   Hint: you may want to go "outside-in" with the chain rule.

4. Graph both h(t) and h'(t) on the same axes:



5. On what day will 90% of the human population (6.8 billion) be annihilated by ZDs?

6. When does the death rate reach half a billion per day?

7. When does the death rate hit its peak?