

6. [13 points] A study of mammals in a particular county in Michigan found that at the time of the study there were N groundhogs and that the population of groundhogs was increasing at a rate of 5% per year. Let $G(t)$ be the number of groundhogs in the county t years after the study.

For full credit on this problem, you must solve for all answers algebraically and show all work step-by-step. Answers should either be in exact form or be given to at least four decimal places.

- a. [2 points] Find a formula for $G(t)$.

Answer: $G(t) =$ _____.

- b. [3 points] Find the *continuous* growth rate of the groundhog population.

Answer: _____

- c. [3 points] How long will it take for the number of groundhogs to double?

Answer: _____

- d. [5 points] In the same study, it was determined that the number of moles and rabbits in the county t years after the study would be given by the formulas $M(t) = 500(0.99)^t$ and $R(t) = 200e^{0.1t}$, respectively. According to these models, when will the population of rabbits be 50% larger than the population of moles?

Answer: _____