

In class worksheet – DO NOT TRY TO REMEMBER FORMULAS for these. Instead, you want to develop patterns and then make up a formula to match the pattern. In particular, base  $e$  should NOT be used.

Percentage growth example

Suppose a population of 10,000 rabbits grows by 5% every year.

Use notation  $P_n$  = population after  $n$  years. So  $P_0 = 10,000$ .

- a) What is  $P_1$ , the population after 1 year? Write a detailed expression showing the calculations you did to find it. Write a formula for  $P_1$  based on any  $P_0$ . Simplify.
- b) What is  $P_2$ , the population after 2 years? Write a detailed expression showing the calculations you did to find it. Write a formula for  $P_2$  based on any  $P_1$ . Simplify. Write a formula for  $P_2$  based on any  $P_0$ .
- c) Observe a pattern in  $P_1, P_2, P_3, \dots$ . Can you write a formula for  $P_{n+1}$  based on  $P_n$ ? Can you write a formula for  $P_n$  based on  $P_0$ ?
- d) Bonus: By what percentage does the population grow over 10 years? Is it the same over every 10 year span? Prove it.