

Practice

Exponential Functions

All Work On Looseleaf
Show the exponential equation used to model each problem, then show the solution. Show work, not just the answers! No work, no credit.

1. Graph: $y = 3^x$
2. Graph: $y = \left(\frac{1}{3}\right)^x$
- } include your t-table

3. If the population of Susan Moore High is 600 students today and is growing at 4% per year. What will be its population in 10 years?

4. If the population of Birmingham is 400000 today and is declining at 1.5% per year. What will be its population in 15 years?

5. Demographics An area in North Carolina known as The Triangle is principally composed of the cities of Durham, Raleigh, and Chapel Hill. The Triangle had a population of 700,000 in 1990. The average yearly rate of growth is 5.9%. Find the projected population for 2010.

6. Finance Determine the amount of money in a savings account that provides an annual rate of 4% compounded monthly if the initial investment is \$1000 and the money is left in the account for 5 years.

7. Investments How much money must be invested by Mr. Kaufman if he wants to have \$20,000 in his account after 15 years? He can earn 5% compounded quarterly.

Pg. 1 of 2 Over →

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The Number e

1. **Demographics** In 1995, the population of Kalamazoo, Michigan, was 79,089. This figure represented a 0.4% annual decline from 1990.
 - a. Let t be the number of years since 1995 and write a function that models the population in Kalamazoo in 1995.
 - b. Predict the population in 2010 and 2015. Assume a steady rate of decline.
2. **Biology** Suppose a certain type of bacteria reproduces according to the model $P(t) = 100e^{0.271t}$, where t is time in hours.
 - a. At what rate does this type of bacteria reproduce?
 - b. What was the initial number of bacteria?
 - c. Find the number of bacteria at $P(5)$, $P(10)$, $P(24)$, and $P(72)$. Round to the nearest whole number.
3. **Finance** Suppose Karyn deposits \$1500 in a savings account that earns 6.75% interest compounded continuously. She plans to withdraw the money in 6 years to make a \$2500 down payment on a car. Will there be enough funds in Karyn's account in 6 years to meet her goal?
4. **Banking** Given the original principal, the annual interest rate, the amount of time for each investment, and the type of compounded interest, find the amount at the end of the investment.
 - a. $P = \$1250$, $r = 8.5\%$, $t = 3$ years, semiannually
 - b. $P = \$2575$, $r = 6.25\%$, $t = 5$ years 3 months, continuously