

- A man invests \$10,000 in an account that pays 8.5% interest per year, compounded quarterly.
 - Find the amount after 3 years.
 - How long will it take for the investment to double?
- A man invests \$6500 in an account that pays 6% interest per year, compounded continuously.
 - What is the amount after 2 years?
 - How long will it take for the amount to be \$8000?
- Find the time required for an investment of \$5000 to grow to \$8000 at an interest rate of 9.5% per year, compounded quarterly.

- Nancy wants to invest \$4000 in saving certificates that bear an interest rate of 9.75% per year, compounded semiannually. How long a time period should she choose in order to save an amount of \$5000?

- How long will it take for an investment of \$1000 to double in value if the interest rate is 8.5% per year, compounded continuously?

- A sum of \$1000 was invested for 4 years, and the interest was compounded semiannually. If this sum amounted to \$1435.77 in the given time, what was the interest rate?

- Find the annual percentage yield for an investment that earns 8% per year, compounded monthly.

- Find the annual percentage yield for an investment that earns $5\frac{1}{2}\%$ per year, compounded continuously.

- The number of bacteria in a culture is modeled by the function

$$n(t) = 500e^{0.45t}$$

where t is measured in hours.

- What is the initial number of bacteria?
- What is the relative rate of growth of this bacterium population? Express your answer as a percentage.
- How many bacteria are in the culture after 3 hours?
- After how many hours will the number of bacteria reach 10,000?

- The number of a certain species of fish is modeled by the function

$$n(t) = 12e^{0.012t}$$

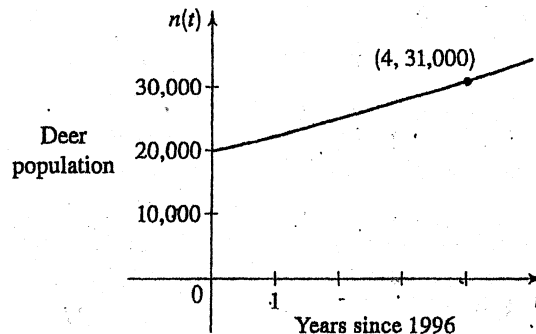
where t is measured in years and $n(t)$ is measured in millions.

- What is the relative rate of growth of the fish population? Express your answer as a percentage.
 - What will the fish population be after 5 years?
 - After how many years will the number of fish reach 30 million?
 - Sketch a graph of the fish population function $n(t)$.
- The population of a certain city was 112,000 in 1994, and the observed relative growth rate is 4% per year.
 - Find a function that models the population after t years.
 - Find the projected population in the year 2000.
 - In what year will the population reach 200,000?

- The frog population in a small pond grows exponentially. The current population is 85 frogs, and the relative growth rate is 18% per year.
 - Find a function that models the population after t years.
 - Find the projected population after 3 years.
 - Find the number of years required for the frog population to reach 600.

- The graph shows the deer population in a Pennsylvania county between 1996 and 2000. Assume that the population grows exponentially.

- What was the deer population in 1996?
- Find a function that models the deer population t years after 1996.
- What is the projected deer population in 2004?
- In what year will the deer population reach 100,000?



- A culture contains 1500 bacteria initially and doubles every 30 min.

- Find a function that models the number of bacteria $n(t)$ after t minutes.
- Find the number of bacteria after 2 hours.
- After how many minutes will the culture contain 4000 bacteria?

- A culture starts with 8600 bacteria. After one hour the count is 10,000.

- Find a function that models the number of bacteria $n(t)$ after t hours.
- Find the number of bacteria after 2 hours.
- After how many hours will the number of bacteria double?

- The count in a culture of bacteria was 400 after 2 hours and 25,600 after 6 hours.

- What is the relative rate of growth of the bacterium population? Express your answer as a percentage.
- What was the initial size of the culture?
- Find a function that models the number of bacteria $n(t)$ after t hours.
- Find the number of bacteria after 4.5 hours.
- When will the number of bacteria be 50,000?

- The population of the world was 5.7 billion in 1995 and the observed relative growth rate was 2% per year.

- By what year will the population have doubled?
- By what year will the population have tripled?

- The population of California was 10,586,223 in 1950 and 23,668,562 in 1980. Assume the population grows exponentially.

- Find a function that models the population t years after 1950.
- Find the time required for the population to double.
- Use the function from part (a) to predict the population of California in the year 2000. Look up the actual California population in 2000, and compare.

- An infectious strain of bacteria increases in number at a relative growth rate of 200% per hour. When a certain critical number of bacteria are present in the bloodstream, a person becomes ill. If a single bacterium infects a person, the critical level is reached in 24 hours. How long will it take for the critical level to be reached if the same person is infected with 10 bacteria?