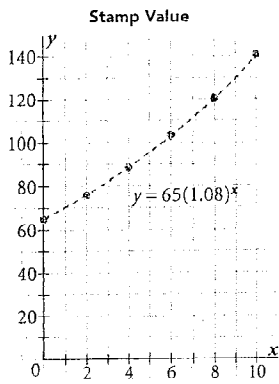


**EXPONENTIAL GROWTH HOMEWORK**

- ① Ontario's population in 1991 was approximately 10.1 million. The population has been increasing at a rate of 1.25% per year.
- Write an equation to represent the population of Ontario,  $y$  millions, as a function of the number of years,  $x$ , since 1991.
  - Suppose the population continues to grow at this rate. Estimate the population in 2041.
- ② In 1626, Manhattan Island in New York was purchased for goods worth about \$24. Suppose the \$24 had been invested at 6% interest compounded annually.
- Write an equation to represent the value of the investment,  $y$  dollars, as a function of the number of years,  $x$ , since 1626.
  - What would the investment be worth at the end of the year 2000?
- ③ A strain of bacteria doubles every hour. Suppose there were 4000 bacteria at the start.
- Write an equation to represent  $y$ , the number of bacteria  $x$  hours from now.
  - How many bacteria would be present after each time?
    - 4 h
    - 6 h
    - 9 h
- ④ A rare stamp was worth \$65 in 1995. It was predicted to grow in value at a rate of 8% per year.
- Write an equation to represent the value of the stamp,  $y$  dollars, as a function of the number of years,  $x$ , since 1995.
  - Graph the equation in part a. Use values of  $x$  from 0 to 10 in steps of 2 years.
  - Use the graph. Estimate the number of years before the value of the stamp is double its value in 1995.
- ⑤ There are 800 caribou in a provincial park. The caribou population has been growing at an annual rate of 2%.
- Write an equation to represent  $y$ , the number of caribou in the park  $x$  years from now.
  - Graph the equation in part a. Use values of  $x$  from 0 to 40 in steps of 5 years.
  - Use the graph to estimate when the caribou population is 1000.
  - Use the graph to estimate how long it will take for the current caribou population to double.

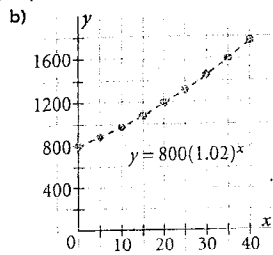
# Answers

- ① a)  $y = 10.1(1.0125)^x$       b) 18.8 million  
② a)  $y = 24(1.06)^x$       b) \$69 900 000 000  
③ a)  $y = 4000(2)^x$   
b) i) 64 000      ii) 256 000      iii) 2 048 000  
④ a)  $y = 65(1.08)^x$   
b)



c) 9 years

⑤ a)  $y = 800(1.02)^x$



c) 11 years

d) 35 years