

## Exponential Growth and Decay

1. The population of a village in New Hampshire is currently 435. If the population is growing at rate of 5% per year, then what will the population be after 20 years? Round your answer to the nearest whole number.
2. A new car costs \$30,000. It depreciates 15% per year. What will its value be after 10 years? Round your answer to the nearest dollar.
3. Raymond buys a new computer for \$2,000. It depreciates 2% per month. What is its value, to the *nearest hundred dollars*, after 1 year?
4. After an oven is turned on, its temperature,  $T$ , is represented by the equation  $T = 400 - 350(3.2)^{-0.1m}$ , where  $m$  represents the number of minutes after the oven is turned on and  $T$  represents the temperature of the oven, in degrees Fahrenheit. How many minutes does it take for the oven's temperature to reach 300° F? Round your answer to the *nearest minute*.
5. A used car was purchased in July 1999 for \$11,900. If the car depreciates 13% of its value each year, what is the value of the car, to the *nearest hundred dollars*, in July 2002?
6. On January 1, 1999, the price of gasoline was \$1.39 per gallon. If the price of gasoline increased by 0.5% per month, what was the cost of gasoline, to the *nearest cent*, on January 1st one year later?
7. Since January 1980, the population of the city of Brownville has grown according to the mathematical model  $y = 720,500(1.022)^x$ , where  $x$  is the number of years since January 1980.  
Explain what the numbers 720,500 and 1.022 represent in this model.  
If this trend continues, use this model to predict the year during which the population of Brownville will reach 1,548,800.
8. The current population of Little Pond, New York is 20,000. The population is *decreasing*, as represented by the formula  $P = A(1.3)^{-0.234t}$ , where  $P$  = final population,  $t$  = time, in years, and  $A$  = initial population. What will the population be 3 years from now? Round your answer to the *nearest hundred people*. To the *nearest tenth of a year*, how many years will it take for the population to reach half the present population?