

## Exponential Functions: Growth and Decay

1. Clara invests \$5000 in an account that pays 6.25% interest per year. When will her investment be worth \$10,000?
2. A city population, which was initially 15,500 has been dropping by 3% each year. Predict when the population will drop below 8000.
3. Tony purchased a rare 1959 Gibson Les Paul guitar in 2000 for \$12,000. Experts estimate that its value will increase by 14% per year. When will the guitar be worth \$60,000?
4. The value of a truck bought new for \$28,000 decreases 9.5% each year. When will the value fall to \$5000.

5. The amount of freight transported by rail in the United States was about 500 billion ton-miles in 1960 and has been increasing at a rate of 2,32% per year. In what year would the number of ton-miles have exceeded 1 trillion (1000 billion)?
  
6. In 1626, The Dutch bought Manhattan Island, now a part of New York City for around \$24 worth of merchandise. Suppose that , instead, the \$24 had been invested in an account that paid 3.5% interest each year. Find the balance in 2008.
  
7. On federal income tax returns self-employed people can depreciate the value of business equipment. Suppose a computer valued at \$2765 depreciates at a rate of 30% per year. Estimate the number of years it will take for the computer's value to be less than \$350.
  
8. For a certain credit card, the total amount you owe after  $n$  months is given by  $A = P(1.015)^n$ . Suppose you begin with a debt of \$1000. You do not charge anything new to the account. How much will you owe after 1 year? How long will it take for the total amount you owe to reach \$1300?