

# Applications

*I once bought an old car back after I sold it because I missed it so much and I had forgotten that it never ran . . . I just wanted it back. I could only remember what was good about it.*

Connie Chung, Television News Commentator

- How might the quote apply to what you have learned?
- Seamus bought a car that originally sold for \$40,000. It exponentially depreciates at a rate of 7.75% per year. Write the exponential depreciation equation for this car.
- Shannon's new car sold for \$28,000. Her online research indicates that the car will depreciate exponentially at a rate of  $5\frac{1}{4}\%$  per year. Write the exponential depreciation formula for Shannon's car.
- Chris purchased a used car for \$19,700. The car depreciates exponentially by 10% per year. How much will the car be worth after 6 years? Round your answer to the nearest penny.
- Laura's new car cost her \$21,000. She was told that this make and model depreciates exponentially at a rate of  $8\frac{5}{8}\%$  per year. How much will her car be worth after 100 months?
- Lisa purchased a used car for  $D$  dollars. The car depreciates exponentially at a rate of  $E\%$  per year. Write an expression for the value of the car in 5 years, in  $A$  years, and in  $M$  months.
- A graphing calculator has determined this exponential regression equation based upon car value data:  $y = a \cdot b^x$ ,  $a = 20,952.11$ , and  $b = 0.785$ . What is the rate of depreciation for this car? How much is this car worth after 6 years; 78 months;  $w$  years?
- A graphing calculator has determined this exponential regression equation based upon car value data:  $y = a \cdot b^x$ ,  $a = 18,547.23$ , and  $b = 0.8625$ . What is the rate of depreciation for this car? How much is this car worth after 6 years, 78 months, and  $w$  months?
- The historical prices of a car are recorded for 11 years as shown.
  - Construct a scatterplot for the data.
  - Determine the exponential depreciation equation that models this data. Round to the nearest hundredth.
  - Determine the depreciation rate.
  - Predict the value of this car after  $3\frac{1}{2}$  years.
- The historical prices of a car are recorded for 17 years as shown.
  - Construct a scatterplot for the data.
  - Determine the exponential depreciation formula that models this data. Round to the nearest hundredth.
  - Determine the depreciation rate.
  - Predict the value of this car after 140 months.

5.25

8.625

Age	Value (\$)	Age	Value (\$)
0	19,000	6	8,600
1	16,325	7	7,200
2	13,700	8	6,900
3	12,000	9	6,000
4	10,500	10	5,600
5	9,700		

Age	Value	Age	Value
0	42,000	9	14,800
1	37,420	10	13,000
2	34,000	11	11,245
3	29,400	12	10,211
4	26,200	13	9,400
5	23,700	14	8,100
6	20,990	15	7,500
7	18,200	16	6,290
8	16,876		