5-5
LINEAR AUTOMOBILE DEPRECIATION

OBJECTIVES

Write, interpret, and graph a straight line depreciation equation.

Interpret the graph of a straight line depreciation.

Key Terms

- **depreciate** – To lose value over time.
- **appreciate** – To gain value over time.
- **straight line depreciation** - The simplest form of depreciation when a car loses the same amount of value each year.
- **slope** - is expressed as a ratio of the change in the vertical variable over the change in the horizontal variable from one point on the line to the next. The independent variable in a car's depreciation equation is time in years and the dependent variable is car value.

What is the value of your car?

- How do the automobile industry, car dealers, and individual owners define “car value”?
- What makes a car valuable to you?
- What factors might contribute to the monetary value of a car?
- Name some items that would appreciate or depreciate over time.

Example 1

Suppose that you purchase a car for $27,000. According to your online research, this make and model of car loses all of its marketable value after 12 years. That is, it depreciates to a value of zero dollars 12 years after the purchase date. If this car depreciates in a straight line form, what are the intercepts of the depreciation equation?

CHECK YOUR UNDERSTANDING

A car sells for D dollars and totally depreciates after T years. If this car straight line depreciates, what are the intercepts of the straight line depreciation equation?

Example 2

Determine the slope of the straight line depreciation equation for the situation in Example 1.

CHECK YOUR UNDERSTANDING

Write the slope of the straight line depreciation equation that models the situation in which a car is purchased for D dollars and totally depreciates after T years.

EXAMPLE 3

Write the straight line depreciation equation for the situation discussed in Examples 1 and 2. Then draw the graph of the equation.

CHECK YOUR UNDERSTANDING

Write and graph the straight line depreciation equation for a car that was purchased for $22,000 and totally depreciates after 11 years.

EXAMPLE 4

Suppose that Jack purchased a car five years ago at a price of $27,600. According to research on this make and model, similar cars have straight line depreciated to zero value after 12 years. How much will this car be worth after 66 months?

CHECK YOUR UNDERSTANDING

A car sells for $18,495 dollars and straight line depreciates to zero after 9 years. Write the straight line depreciation equation for this car and an expression for the value of the car after *W* months.

EXAMPLE 5

The straight line depreciation equation for a car is $y = -4{,}000x + 32{,}000$. In approximately how many years will the car's value decrease by 25%?

EXAMPLE 6

Celine bought a new car for $33,600. She made a $4,000 down payment and pays $560 each month for 5 years to pay off her loan. She knows from her research that the make and model of the car she purchased straight line depreciates to zero over 10 years.

a. Create an expense and depreciation function.

b. Graph these functions on the same axes.

c. Interpret the region before, at, and after the intersection point.