The value of a computer, or an automobile, or a machine *depreciates* (decreases) over time. **Linear depreciation** means that the value of the item at time x is given by a linear function $f(x) = mx + b$. The slope m of this line gives the rate of depreciation.

EXAMPLE: According to the *Kelley Blue Book*, a Ford Mustang two-door convertible that is worth \$14,776 today will be worth \$10,600 in two years (if it is in excellent condition with average mileage).

(a) Assuming linear depreciation, find the depreciation function for this car.

Solution: We know the car is worth \$14,776 now ($x = 0$) and will be worth \$10,600 in two years ($x = 2$). So the points $(0, 14{,}776)$ and $(2, 10{,}600)$ are on the graph of the linear depreciation function and can be used to determine its slope:

$$m = \frac{10,600 - 14,776}{2} = \frac{-4176}{2} = -2088$$

Using the point (0, 14,776), we find that the equation of the line is

$$\begin{aligned} y - 14,776 &= -2088(x - 0) \\ y - 14,776 &= -2088x \\ y &= -2088x + 14,776. \end{aligned}$$

Therefore, the rule of the depreciation function is $f(x) = -2088x + 14,776$.

(b) What will the car be worth in 4 years?

Solution: Evaluate f when $x = 4$:

$$\begin{aligned} f(x) &= -2088x + 14,776 \\ f(4) &= -2088(4) + 14,776 = \$6424 \end{aligned}$$

(c) At what rate is the car depreciating?

Solution: The depreciation rate is given by the slope of $f(x) = -2088x + 14,776$, namely, -2088. This negative slope means that the car is decreasing in value an average of \$2088 a year.