Depreciation Suppose the cost of a business property is $860,000 and a company depreciates it with the straight-line method. Suppose \( y \) is the value of the property after \( t \) years.\(^1\)

Let’s start by making sure that we know what is meant by depreciating something with the straight-line method. In business and accounting, straight-line depreciation is the simplest and most often used method. As the name suggests, this method describes a constant (or straight line) drop in value spread evenly across the life of an asset or product.

**a. What is the value at the beginning of the depreciation (when \( t = 0 \))?**

The purchase price of the property, when \( t = 0 \), is $860,000.

**b. If the property is completely depreciated (\( y = 0 \)) in 25 years, write the equation of the line representing the value as a function of years.**

Notice that we have two points in the form (time, value), or \((t, y)\). The first point, \((0, 860,000)\), tells us that at time \( t = 0 \), the value of the property is $860,000. The second point, \((25, 0)\), tells us that after 25 years, \( t = 25 \), the value of the property is $0.

We’ll use these two points and find the equation of the line through them. I’m going to find the slope, \( m \), and then use the point-slope equation of a line.

If \((0, 860,000)\) is the first point and \((25, 0)\) is the second point,

\[
m = \frac{y_2 - y_1}{t_2 - t_1} = \frac{0 - 860,000}{25 - 0} = \frac{-860,000}{25} = -34,400
\]

Use \( m \) and either point to fill in the point-slope equation and solve for \( y \).

\[
y - y_1 = m(t - t_1)
y - 860,000 = -34,400(t - 0)
y - 860,000 = -34,400t
y = 860,000 - 34,400t
\]

The equation of the line representing value as a function of years is: \( y = 860,000 - 34,400t \)

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\(^1\)Harshbarger/Yocco, College Algebra In Context, 5e, p. 72, #52.