Simple Depreciation

Example 1: In 2000, the B&C Company installed a new machine in one of its factories at a cost of $250,000. The machine is depreciated linearly over 10 years with a scrap value of $10,000.

a. Find the rate of depreciation for this machine.

b. Find an expression for the machine’s book value in the $t$-th year of use ($0 \leq t \leq 10$).

c. Find the machine’s book value at the end of the 7th year.

Example 2: A company car has an original value of $35,250 and it will be depreciated linearly over 5 years with a scrap value of $7,000.

a. Find the rate of depreciation for this car.

b. Find an expression for the car’s book value in the $t$-th year of use ($0 \leq t \leq 5$).
Linear Cost, Revenue and Profit Functions

Let \( x \) be the number of units of a product manufactured or sold at a company then:

The **cost function**, \( C(x) \), is the total cost of manufacturing \( x \) units of the product. 
**Fixed costs** are costs that remain more or less constant regardless of the company’s activity level.

Example: rental fees and executive salaries

**Variable costs** are costs that vary with production or sales.

Example: wages and costs for raw material

The **revenue function**, \( R(x) \), is the total revenue realized from the sale of \( x \) units of the product.

The **profit function**, \( P(x) \), is the total profit realized from manufacturing and selling \( x \) units of the product.

**Formulas**
Suppose a company has fixed cost of \( F \) dollars, production cost of \( c \) dollars per unit and selling price of \( s \) dollars per unit then

\[
C(x) = cx + F \\
R(x) = sx \\
P(x) = R(x) - C(x) = (s - c)x - F
\]

where \( x \) is the number of units of the product produced and sold.

Example 2: A manufacturer has a monthly fixed cost of $100,000 and a production cost of $14 for each unit produced. The product sells for $20 per unit.

a. Find the cost, revenue and profit functions.

b. Compute the profit (loss) corresponding to production levels of 15,000 units and 27,500 units.
Example 3: A company that manufactures motorcycle helmets has monthly fixed costs of $55,000 and monthly cost of $21 per helmet. The selling price for each unit is $41.

a. How many helmets must the company produce and sell if they wish to make a profit of $50,000?

b. What is the profit (loss) if they produce and sell 3500 helmets?