DEFINITION: The rate of change of the cost function is called the **marginal cost**.

REMARK 1: Marginal cost is important to management in making decisions in such areas as cost control, pricing, and production planning. When the cost function is linear, say, $C(x) = mx + b$, the marginal cost is m (the *slope* of the graph of C).

REMARK 2: Marginal cost can also be thought of as the *cost of producing one more item.*

EXAMPLE: An electronics company manufactures handheld PCs. The cost function for one of its models is $C(x) = 160x + 750,000$.

(a) What are the fixed costs for this product?

Solution: The fixed costs are

$$C(0) = 160(0) + 750,000 = \$750,000$$

(b) What is the marginal cost?

Solution: The slope of $C(x) = 160x + 750,000$ is 160, so the marginal cost is \$160 per item.

(c) After 50,000 units have been produced, what is the cost of producing one more?

Solution: We have

$$C(50,000) = 160(50,000) + 750,000 = \$8,750,000 \quad \text{(cost of producing 50,000 units)}$$

$$C(50,001) = 160(50,001) + 750,000 = \$8,750,160 \quad \text{(cost of producing 50,001 units)}$$

The cost of the additional unit is the difference

$$C(50,001) - C(50,000) = 8,750,160 - 8,750,000 = \$160$$

Thus, the cost of one more item, is the marginal cost.

In a **linear cost function** $C(x) = mx + b$, the marginal cost is m (the slope of the cost line) and the fixed cost is b (the y-intercept of the cost line). The marginal cost is the cost of producing one more item.

Similarly, in a **linear revenue function** $R(x) = kx + d$, the marginal revenue is k (the slope of the revenue line), which is the revenue from selling one more item.