

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

REMARK: When the revenue function is linear, the marginal revenue is the *slope* of the line, as well as the *revenue from producing one more item*.

EXAMPLE: The energy company New York State Electric and Gas charges each residential customer a basic fee for electricity of \$15.11, plus \$.0333 per kilowatt hour (kWh).

(a) Assuming there are 700,000 residential customers, find the company's revenue function.

Solution: The monthly revenue from the basic fee is

$$15.11(700,000) = \$10,577,000$$

If  $x$  is the total number of kilowatt hours used by all customers, then the revenue from electricity use is  $.0333x$ . So the monthly revenue function is given by

$$R(x) = .0333x + 10,577,000$$

(b) What is the marginal revenue?

Solution: The marginal revenue (the rate at which revenue is changing) is given by the slope of the rate function: \$0.0333 per kWh.

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.