

Marginals: $\overline{MR} = R'(x)$ Marginal Revenue

$\overline{MC} = C'(x)$ Marginal Cost

$\overline{MP} = P'(x)$ Marginal Profit

Remark

Estimated $\underline{MR}$ for item $x=c+1$ is $R(c)$
Estimated $\underline{MC}$ for item $x=c+1$ is $C(c)$
Estimated $\underline{MP}$ for item $x=c+1$ is $P(c)$

True (Exact) $\underline{MR}$ for item $x=c+1$ is $\Delta R = R(c+1) - R(c)$

True (Exact) $\underline{MC}$ for item $x=c+1$ is $\Delta C = C(c+1) - C(c)$

True (Exact) $\underline{MP}$ for item $x=c+1$ is $\Delta P = P(c+1) - P(c)$

$$\text{Error} = | \text{True} - \text{Estimated} |$$

$$E_{MR} = | \Delta R - R'(c) |$$

$$E_{MC} = | \Delta C - C'(c) |$$

$$E_{MP} = | \Delta P - P'(c) |$$

$$\underbrace{R'(c)}_{\text{Est. Rev.}} \approx \underbrace{\Delta R = R(c+1) - R(c)}_{\text{Exact Revenue}}$$

$$\underbrace{C'(c)}_{\text{Est. Cost}} \approx \underbrace{\Delta C = C(c+1) - C(c)}_{\text{Exact Cost}}$$

$$\underbrace{P'(c)}_{\text{Est. profit}} \approx \underbrace{\Delta P = P(c+1) - P(c)}_{\text{Exact Profit}}$$

MR = 1 -

Est. profit

Exact profit

$\Delta P > 0 \Rightarrow \text{profit}$

$\Delta P < 0 \Rightarrow \text{loss}$

Exp Given the Revenue function

$$R(x) = 300x - x^2$$

① Find marginal revenue at $x=50$. ✓
What does this mean? ←

$$MR = R'(50)$$

$$= 300 - 2(50)$$

$$= 300 - 100$$

$$= \$200$$

What does $R'(50) = \$200$?

This means the Estimated MR for item 51

② Find $R(51) - R(50)$. What does this mean.

$$R(x) = 300x - x^2$$

$$\Delta R = R(51) - R(50)$$

$$R(51) = 300(51) - (51)^2$$

$$= 15,300 - 2601$$

$$= \$12,699$$

$$\Delta R = R(51) - R(50)$$

$$= 12,699 - 12,500$$

$$= \$199$$

This means the exact MR for item 51 is \$199

$$= \$12,699$$

$$R(50) = 300(50) - 50^2$$

$$= 15,000 - 2,500$$

$$= 12,500 \text{ dollar}$$

(3) Find E_{MR} • what do you conclude?

$$E_{error} = |T - E|$$

$$= |\Delta R - R'(50)|$$

$$= |199 - 200|$$

$$= |-1|$$

$$= 1 \text{ dollar}$$

$R'(50) = \$200$ is good approximate for the exact MR for item 51 which \$199.