Section 9.7 Solutions 35, 45

#35] $C(x) = 60{,}000 + 300x$

A) $\bar{C}(x) = \frac{C(x)}{x} = \frac{60{,}000}{x} + 300 = 60{,}000x^{-1} + 300$

$\bar{C}(500) = \frac{60{,}000}{500} + 300 = \$420$

B) $\bar{C}'(x) = -60000\,x^{-2} = \frac{-60{,}000}{x^2}$

$\bar{C}'(500) = \frac{-60{,}000}{500^2} = -0.24$

At a production level of 500 units, the average cost per unit is decreasing \$0.24 per unit

C) $420 - .24 = \$419.76 \simeq \bar{C}(501)$

Selected Solution 9.7

\# 45

(A) $x = 6000 - 30p$ $\qquad$ $x \geq 0$, $x \leq 6000$

$30p = 6000 - x$ $\qquad$ $p \geq 0$ therefore

$p = 200 - \frac{1}{30}x$ $\qquad$ $x \leq 200(30) = 6000$

(B) $C(x) = 72\,000 + 60x$

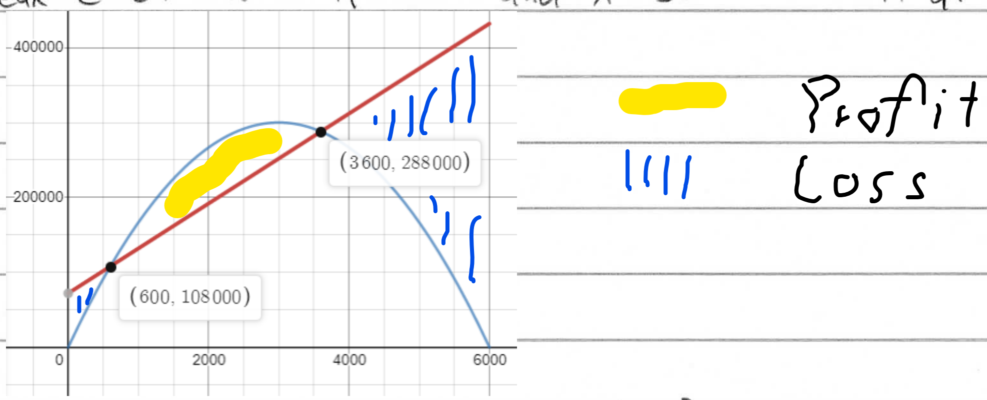
$C'(x) = 60$

(C) $R(x) = px = 200x - \frac{1}{30}x^2$ $\qquad$ $0 \leq x \leq 6000$

(D) $R'(x) = 200 - \frac{1}{15}x$

(E) Skip

(F) Break even at $x = 600$ and $x = 3600$ $\quad$ Profit at $600 < x < 3600$



(G) $P(x) = R(x) - C(x) = 200x - \frac{1}{30}x^2 - 72000 - 60x$

$= 140x - \frac{1}{30}x^2 - 72000$

(H) $P'(x) = 140 - \frac{1}{15}x$

(I) $P'(1500) = 140 - 100 = 40$ $\quad$ Profit increasing \$40/unit

$P'(3000) = 140 - 200 = -60$ $\quad$ Profit decreasing \$60/unit