12/5 p1.

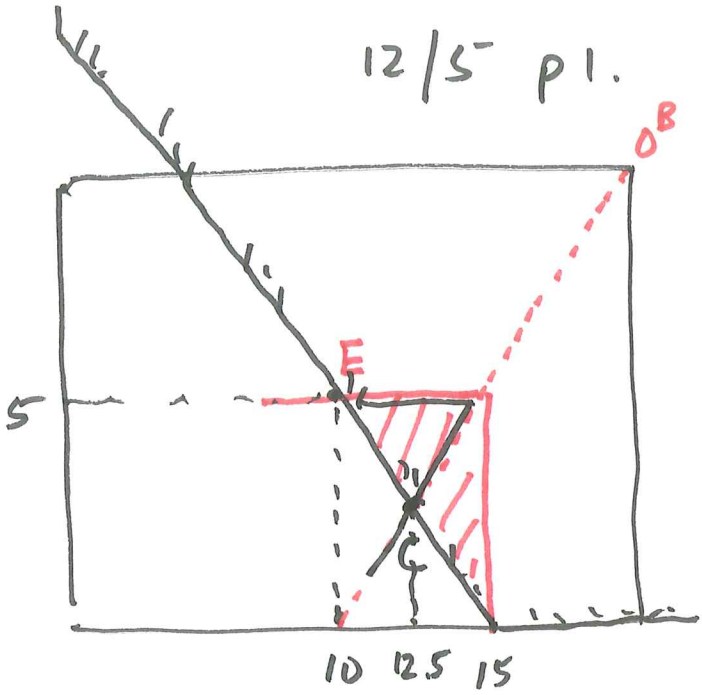
7.10

$$u^A = x^A + y^A$$

$$u^B = \min[x^B, y^B]$$

$$x^A, y^A = (12.5, 2.5)$$

$$x^B, y^B = (7.5, 7.5)$$



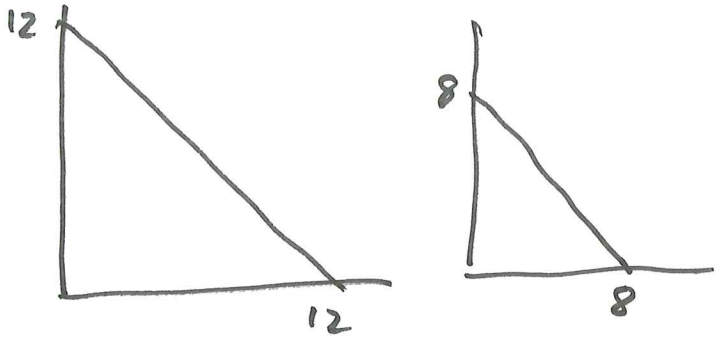
9.8

$$q_A = 12 - p$$

$$q_B = 8 - p$$

$$q_b = 20 - 2p$$

$$Q = 2000 - 200p$$



(b)

$$200p = 2000 - Q$$

$$p = 10 - \frac{1}{200}Q$$

$$TR = pQ = 10Q - \frac{1}{200}Q^2$$

$$MR = 10 - \frac{1}{100}Q = 0$$

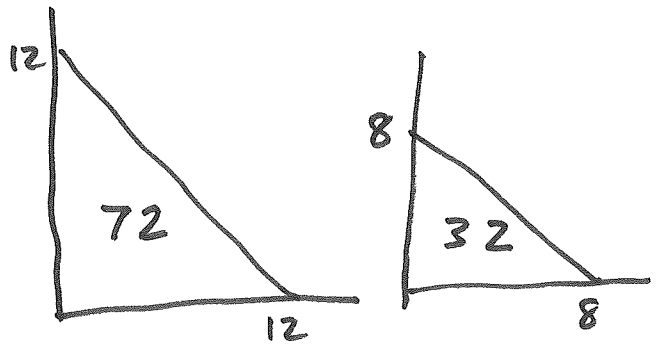
$$Q^* = 1000$$

$$p^* = 5$$

$$\pi = 5000$$

9.8.(c) $p = 72$

$\pi = 7200$



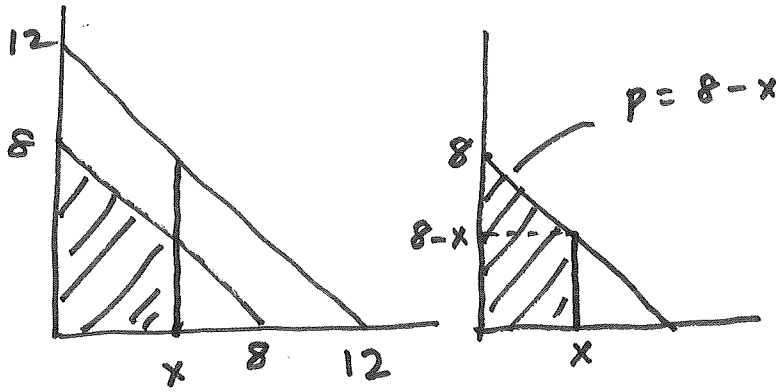
(d)

$P_{smurfs} =$

$\frac{1}{2} \cdot x \cdot x + x(8-x)$

$= \frac{1}{2}x^2 + 8x - x^2$

$= 8x - \frac{1}{2}x^2$



Surplus for munchkins from x-packet $= 4x$

P_{munchk} $P_{12} = 72 - 4x$

$\pi = 100\left(72 - 4x + 8x - \frac{1}{2}x^2\right)$

$\frac{d\pi}{dx} = 100\left(-4 + 8 - x\right) = 0$

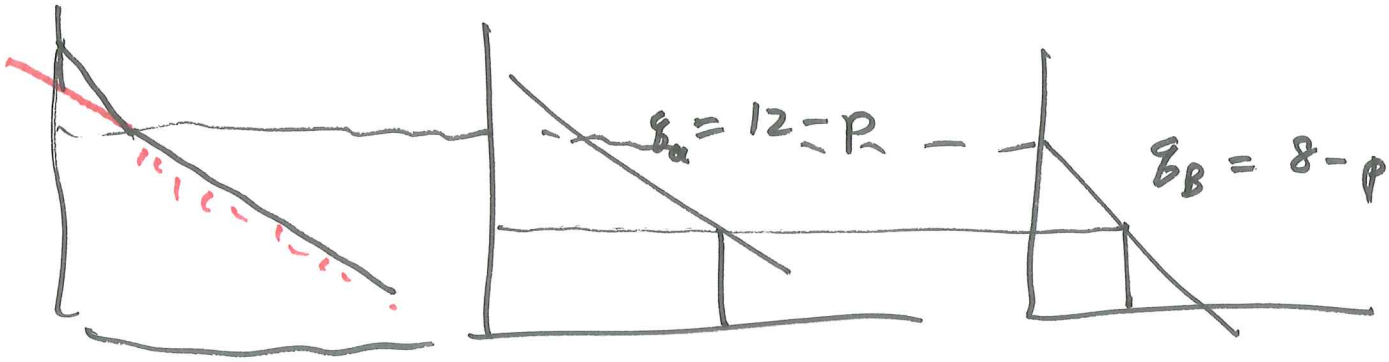
$\underline{\underline{x = 4}}$

$P_4 = 8x - \frac{1}{2}x^2 = 32 - 8 = \$24$

$P_{12} = 72 - 16 = \$56$

$\pi = 8{,}000$

Horizontal vs Vertical summation.



$$Q = q_A + q_B = 20 - 2P$$

$$q_a = 12 - P$$

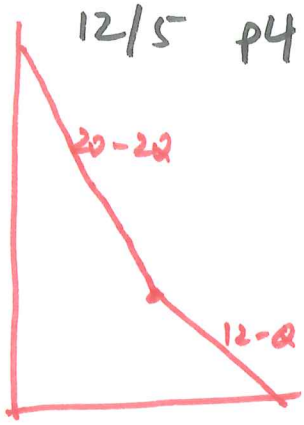
$$q_b = 8 - P$$

$$q_b = \begin{cases} 0 & \text{for } P \geq 8 \\ 8 - P & \text{for } P < 8 \end{cases}$$

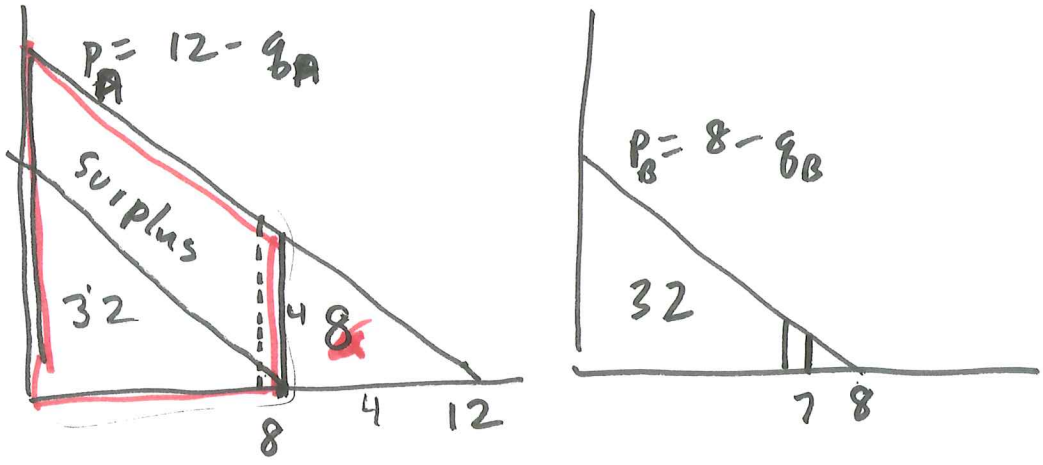
$$Q = \begin{cases} 12 - P & \text{for } P \geq 8 \\ 20 - 2P & \text{for } P < 8 \end{cases}$$

Vertical: $MB_A = P_A = 12 - q_A$ $\quad MB_B = P_B = 8 - q_B$

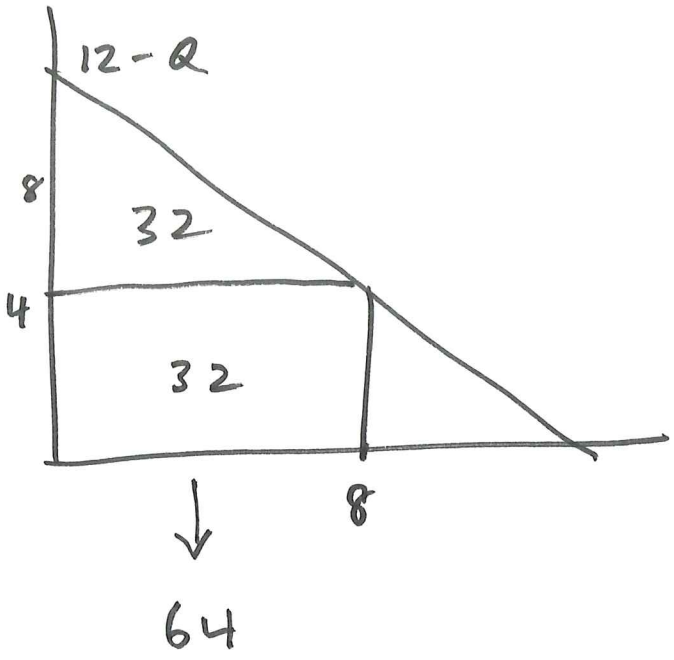
$$SMB = \begin{cases} 20 - 2Q & \text{for } Q \leq 8 \\ 12 - Q & \text{for } Q > 8 \end{cases}$$



Second-degree price discrimination



31.5



↓

64

11.10

$$C_i = 10q_i + \frac{1}{2}q_i^2$$

$$MC_i = 10 + q_i$$

$$P = 10 + q_i$$

$$q_i = P - 10$$

~~$P_s = 20 + 20Q$~~

$$Q_s = 2P - 20$$

$$Q_d = 100 - P$$

$$2P - 20 = 100 - P$$

$$3P = 120$$

$$P = 40, \quad Q = 60$$

$$q_i = 30$$

(b) $\pi = (q_1 + q_2)(100 - q_1 - q_2) - 10q_1 - \frac{1}{2}q_1^2 - 10q_2 - \frac{1}{2}q_2^2$

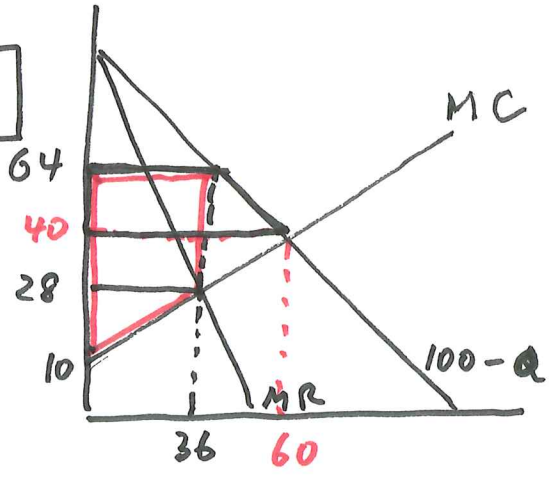
~~$\frac{\partial \pi}{\partial q_1} = 100$~~ $\quad q_1 = q_2 = 18, \quad P = 64$

(c) $\Delta CS = -\left[(24)(36) + \frac{1}{2}(24)(24)\right]$

$= -1152$

$\pi_{comp} = \frac{1}{2} \cdot 30 \cdot 60 = 900$

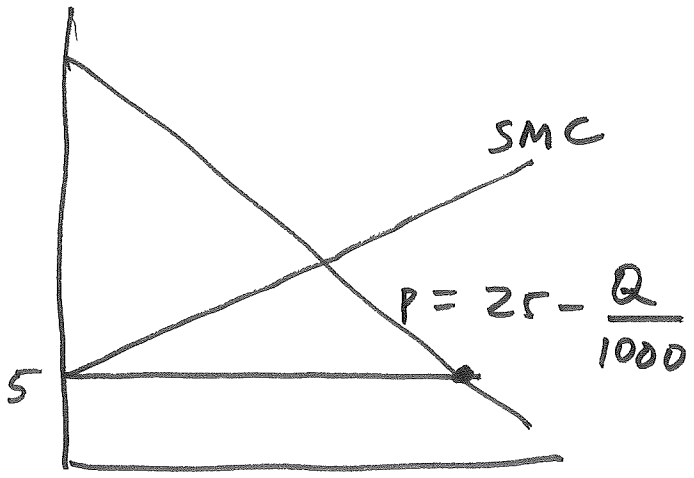
$\pi_{cartel} = 1620$; $\Delta\pi = 720$



(d) $\Delta W = -432$

12.2 (a) $P^* = 5$

$Q^* = 20{,}000$



(b) $D = \frac{W^2}{8000} = \frac{Q^2}{8000}$

$MD = \frac{Q}{4000}$

$SMC = 5 + \frac{Q}{4000}$

W^* at $5 + \frac{Q}{4000} = 25 - \frac{Q}{1000}$

$\frac{5Q}{4000} = 20$

$Q = 16{,}000$

$P = 9$

$$W = \overset{CS}{\frac{Q^2}{2000}} + \left[20Q - \frac{1}{1000}Q^2\right] - \frac{Q^2}{8000}$$

$$\frac{dW}{dQ} = \frac{Q}{1000} + 20 - \frac{1}{500}Q - \frac{Q}{4000} = 0$$

$$20 = \frac{1+8-4}{4000}Q = \frac{5}{4000}Q$$

$Q = 16{,}000$

$$W = \frac{Q^2}{2000} + \left(20Q - \frac{Q^2}{1000}\right) - \left(\frac{(Q-A)^2}{8000}\right) - \frac{A^2}{2000}$$

$$\frac{\partial W}{\partial Q} = \frac{Q}{1000} + 20 - \frac{2Q}{1000} - \frac{Q-A}{4000} = 0$$

$$\frac{\partial W}{\partial A} = -\frac{Q-A}{4000}(-1) - \frac{2A}{2000} = 0$$

$$Q = \frac{100,000}{6}, \quad P = 8\frac{1}{3}$$