$P_H = 20 - \frac{1}{4} Q_H$ $P_L = 10 - \frac{1}{4} q_L$ $f_H = .5$ $MC = 2$

$E(\pi) = \frac{1}{2}(20 - \frac{1}{4} q) q + \frac{1}{2}(10 - \frac{1}{4} q) q - 2q$

$\quad \rightarrow \frac{1}{2}(20 - \frac{1}{2} q) + \frac{1}{2}(10 - \frac{1}{2}) q = 2$

$\quad \rightarrow 10 - \frac{1}{4} q + 5 - \frac{1}{4} q = 2$

$\qquad 13 = \frac{1}{2} q$

$\qquad q = 26$

$P_H = 20 - 26/4 = 13.50$, $\pi_H = (13.50 - 2) 26 = 299$
$L_L = 10 - 26/4 = 3.50$; $\pi_L = (3.5 - 2) 26 = 39$

$\qquad\qquad\qquad \rightarrow E(\pi) = \frac{1}{2} 299 + \frac{1}{2} 39 = 169$

$R_L = (10 - \frac{1}{4} q_L) q_L \rightarrow 10 - \frac{1}{2} q_L = 0 \rightarrow q_L = 20$ $\boxed{\text{max revenue}}$

$\qquad$ "free disposal"

$E(\pi) = \frac{1}{2} \underbrace{(20 - \frac{1}{4} q_H) q_H}_{\rightarrow P_r (H) \rightarrow P_H} + \frac{1}{2} \underbrace{(10 - \frac{1}{4} q_L) q_L}_{\rightarrow P_r (LS) \rightarrow P_L} - \underbrace{2 q_H}_{\rightarrow C}$

$\dfrac{\delta E(\pi)}{\delta q_H} = \frac{1}{2}(20 - \frac{1}{2} q_H) - 2 = 0$

$\qquad 20 - \frac{1}{2} q_H = 4 \qquad \rightarrow P_H = 20 - 32/4 = 12$

$\qquad \frac{1}{2} q_H = 16$

$\qquad q_H = 32$

$E(\pi) = \frac{1}{2} \cdot 12 \cdot 32 + \frac{1}{2} \cdot .5 \cdot 20 - 2 \cdot 32$

$\qquad = \frac{1}{2}(10 \cdot 32) + \frac{1}{2}(5 \cdot 70)$

$\qquad = 160 + 50$

$\qquad = 210$

Example with Perfect Information

High
$M R_H = 20 - \frac{1}{2} q_H = 2 \rightarrow q_H = 36 \qquad \rightarrow P_H = 20 - \frac{36}{4} = 11 \rightarrow \pi_h = 324$

Low
$M R_L = 10 - \frac{1}{2} q_L = 2 \rightarrow q_L = 16 \qquad \rightarrow P_L = 10 - \frac{1}{4} \cdot 16 = 6 \rightarrow \pi_L = 64$

$E(\pi) = \frac{1}{2} 324 + \frac{1}{2} 64 = 194$

Value of Perfect info $= 194 - 178 = 16$