

Daily Exercise Solution

Given information:

$$WTP = 400 - 4Q_M^D$$

$$WTA = 80$$

$$MC_e = Q_M^S$$

Market equilibrium:

$$WTP = WTA$$

$$400 - 4Q_M^D = 80$$

$$Q_M^D = Q_M^S$$

$$400 - 4Q_M^D = 80$$

$$320 = 4Q_M^D$$

$$Q_M^D = 80$$

$$P_1^d = WTP = 400 - 4(80) = 80$$

$$P_1^s = WTA = 80$$

Efficient quantity:

$$WTP = MSC$$

$$MSC = WTA + MC_e$$

$$MSC = 80 + Q_M^S$$

$$400 - 4Q_M^D = 80 + Q_M^S$$

$$Q_M^D = Q_M^S$$

$$320 = 5Q_M^D$$

$$Q_M^D = 64$$

Optimal tax rate:

$$T = MC_e(Q_M^e)$$

$$MC_e(64) = 64$$

$$T = 64$$

Checking via prices at efficient Q:

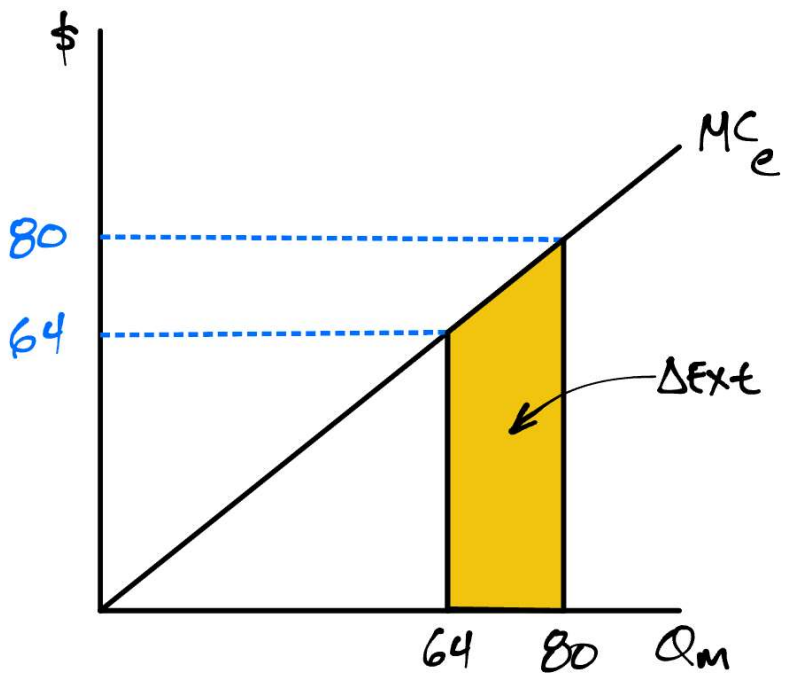
$$P_2^d = WTP(64) = 400 - 4 * 64 = \$144$$

$$P_2^s = WTA(64) = \$80$$

$$P^d = P^s + T$$

$$T = 144 - 80 = 64$$

Overall change in external costs:



$$\Delta Ext = 16 * \frac{64 + 80}{2}$$

$$\Delta Ext = 1152$$