

### Week 1 — Q6

Given:  
 $Y = 80$   
 $Q = 40$

$$Q = 60 + 0.5Y - 3P$$

$$40 = 60 + (0.5 \times 80) - 3P$$

$$\Rightarrow 3P = 60 + 40 - 40$$

$$\Rightarrow P = \frac{60}{3} = 20$$

$$\text{Maximum WTP} = 30$$

→ Willingness to Pay

$$CS = \text{Max WTP} - P$$

$$CS = 30 - 20 = 10$$

### Week 1 : Market Demand

$$Q_1 = 10 - 2.5P$$

$$Q_2 = 15 - 5P$$

In eqn (1),

$$Q_1 = 0 \Rightarrow P = 4$$

In eqn (2),

$$Q_2 = 0 \Rightarrow P = \frac{15}{5} = 3$$

If  $P \leq 3$ ,

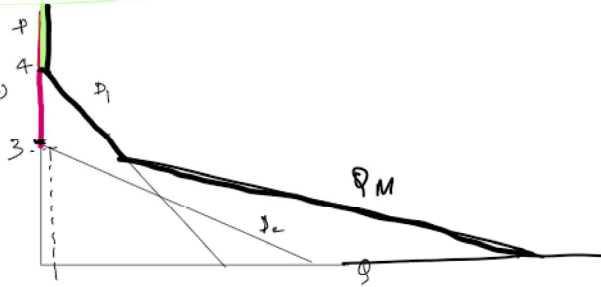
$$Q_M = Q_1 + Q_2 = 25 - 7.5P$$

If  $3 \leq P \leq 4$ ,

$$Q_M = Q_1 \Rightarrow Q_M = 10 - 2.5P$$

If  $P > 4$ ,

$$Q_M = 0$$



$$\text{At } P = 3, Q_2 = 0$$

$$Q_M = Q_1 + Q_2 = Q_1$$

$$\text{At } P = 4, Q_2 = 0, Q_1 = 0$$

$$Q_M = Q_1 \text{ or } Q_M = 0$$

### Week 2, Q1

i) D:  $P_x = 2000 - 4Q$

S:  $P_x = 300 + 6Q$

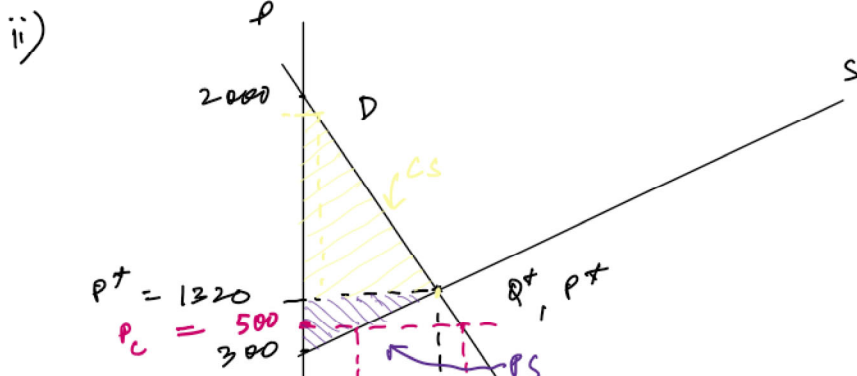
$$2000 - 4Q = 300 + 6Q$$

$$1700 = 10Q$$

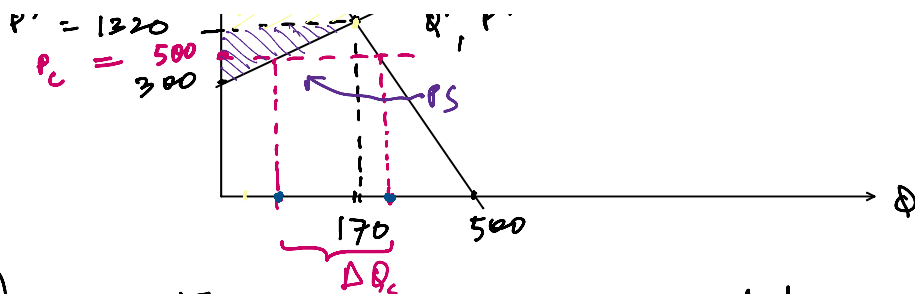
$$Q = 170$$

$$P = 2000 - (4 \times 170) = 1320$$

Equilibrium



$$CS = \frac{1}{2} \times (2000 - 1320) \times 170$$



iii) Quantity traded in the market:

$$P_c = 300 + 6Q_c$$

$$\Rightarrow 500 = 300 + 6Q_c$$

$$\Rightarrow Q_c = \frac{200}{6} = 33.33$$

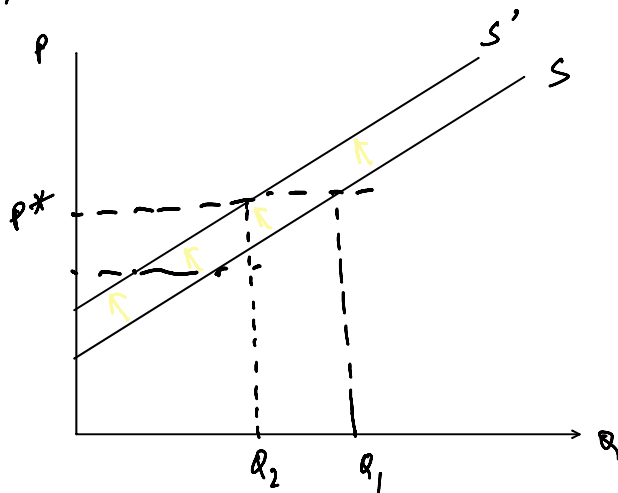
iv) Shortfall. Market Demand is given by:

$$P = 2000 - 4Q_D$$

$$Q_D = \frac{2000 - 500}{4} = \frac{1500}{4} = 375$$

$$\text{Shortfall} = Q_D - Q_c = 375 - 33.33 = 341.67$$

Week 2, Q2



Week 2, Q4

$$Q_s = 58 + 15p - 20p_f^2$$

$$\text{Initial } p_f = 0.4$$

$\therefore$  initial supply is given by:

$$Q_s = 58 + 15p - (20 \times 0.4)$$

$$Q_s = 50 + 15p$$

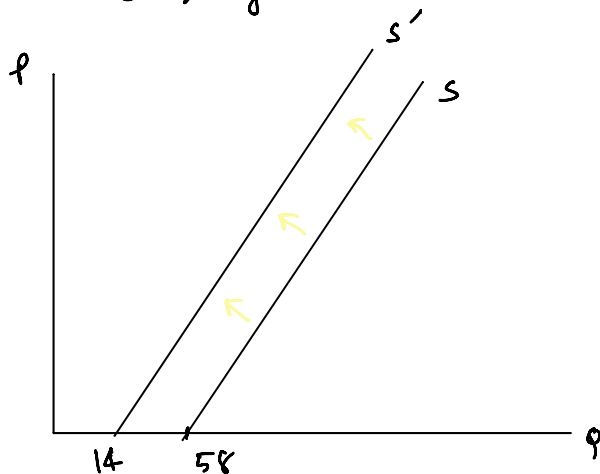
$$\text{New } p_f = 1.8 + 0.4 = 2.2$$

New supply is given by:

$$Q_s' = 58 + 15p - (20 \times 2.2)$$

$$Q_s' = 14 + 15p$$

This shift in supply is best seen on the diagram



Week 2, Q5

$$Q_D = a - bp$$

$$Q_S = c + ep$$

In equilibrium,

$$a - bp = c + ep$$

$$\therefore a - c = (b + e)p^*$$

$$p^* = \frac{a - c}{b + e}$$

$$Q_S = Q_D = Q^*$$

$$Q^* = c + e \cdot p^*$$

$$Q^* = c + e \cdot \left( \frac{a - c}{b + e} \right)$$

$$Q^* = \frac{bc + e\cancel{c} + ea - e\cancel{c}}{b + e}$$

$$Q^* = \frac{bC + eA}{b + c}$$

Week 2, Q6

Since MC for no. of bicycles \$50 is less than market price, he will sell 50 bicycles.

Q7 Consumer surplus =  $50 \times (6000 - 5700)$   
 $= 50 \times 300 = 15000$