A: FALSE

$P=10 \quad Q_d=45$

$Q_s = 40$

$Q_d > Q_s$

B. FALSE

$Q=40 \quad P_d = \frac{75-40}{3} = \frac{35}{3}$

$P_s = \frac{40-20}{2} = 10$

C. TRUE

Before $75-3P = 20+2P$ $5P = 55$ $P=11$

$Q = 42.$

After change $Q_d = 44-P_d$

$Q_s = 20+2P_s$

$44-P = 20+2P$

$3P = 24 \quad P=8$

$Q = 36$

D. FALSE

$$\text{Revenue} = pQ = p(50-2p)$$

$$= 50p - 2p^2$$

This is maximized when

$$4p = 50 \quad p = \frac{25}{2}$$

$$Q = 50 - 2p = 50 - 25 = 15.$$

E TRUE

$$\text{Profit} = \text{Revenue} - \text{Cost}$$

$$\text{Revenue} = pQ = \frac{50-Q}{2} \cdot Q$$

$$\text{profit} = \frac{50}{2}Q - \frac{1}{2}Q^2 - 2Q^2 - 5Q - 5$$

$$= 20Q - \frac{5}{2}Q^2 - 5.$$

maximized when $20 = 5Q \quad Q = 4$