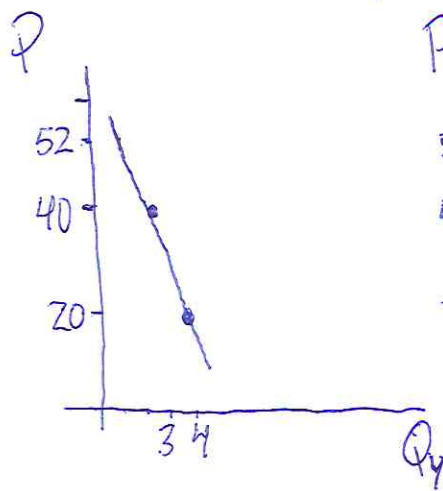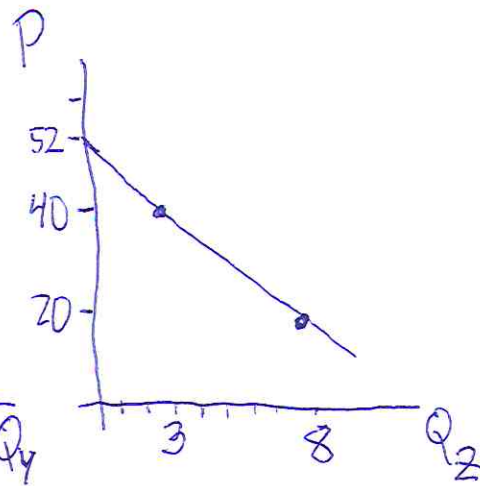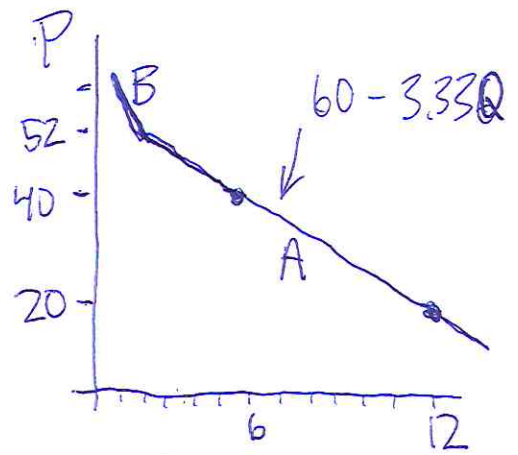# Horizontal summation of demand

$$P = 100 - 20Q_y$$

$$P = 52 - 4Q_z$$

To sum demand ~~vertically~~ horizontally, rewrite in terms of Q.

$$Q_y = 5 - .05P$$

$$Q_z = 13 - .25P$$

$$Q_{Market} = Q_y + Q_z = (5 - .05P) + (13 - .25P)$$
$$= (18 - .03P)$$

or

$$P = 60 - 3.33Q$$

When $P = 40$, $Q_{Market} = 6$
When $P = 20$, $Q_{Market} = 12$

But note: When $P > 52$, $Q_z = 0$
  so

$$Q_{market} = 5 - .05P \text{ if } 52 < P < 100$$
$$Q_{market} = 18 - .3P \text{ if } P < 52$$

The curve has a kink at $P = 52$