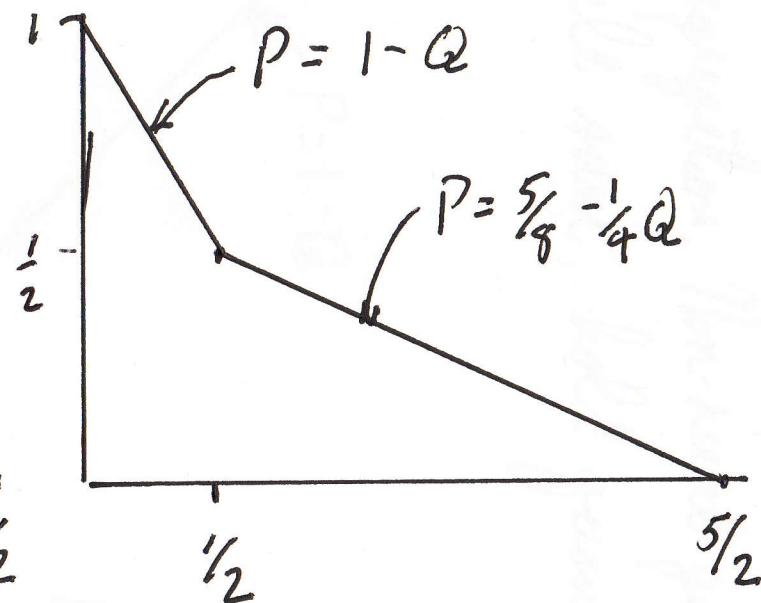
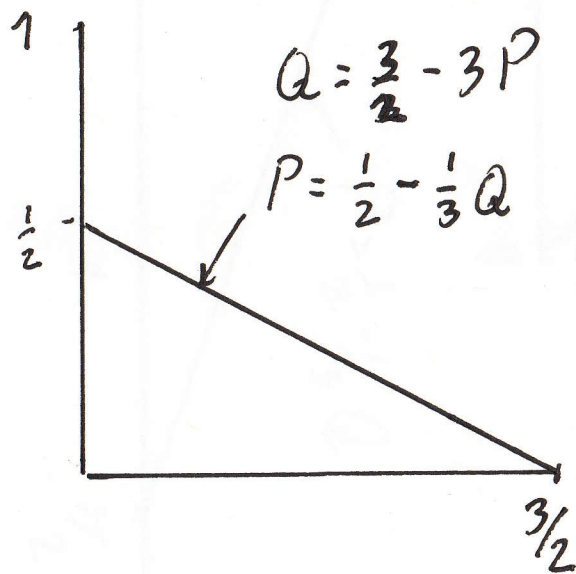
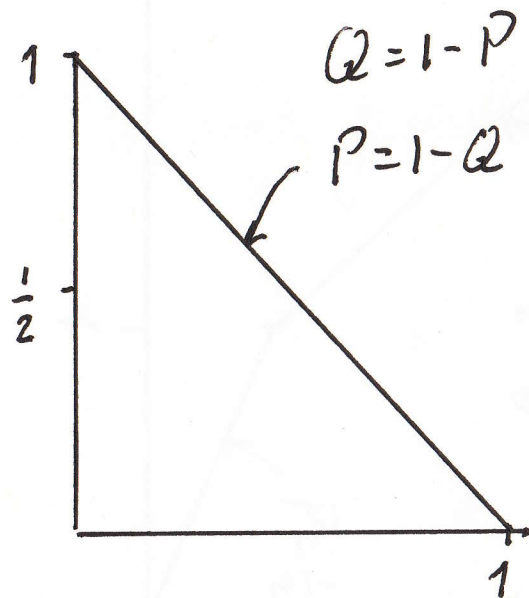


Demand aggregation, rival goods  $\Rightarrow$  horizontal sum i.e.  
 hold price fixed, add quantities



$$0 \leq P \leq \frac{1}{2} \quad Q = 1 - P + \frac{3}{2} - 3P = \frac{5}{2} - 4P \Rightarrow P = \frac{5}{8} - \frac{1}{4}Q$$

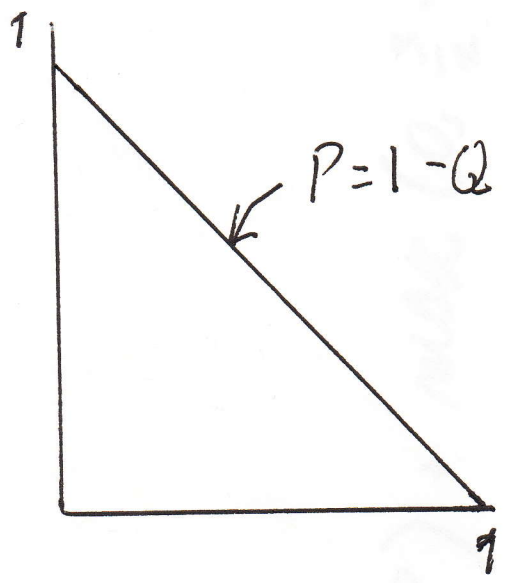
$$\frac{1}{2} \leq P \leq 1 \quad Q = 1 - P \Rightarrow P = 1 - Q$$

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Critical assumption: Both groups pay the same price.

Demand aggregation, Non-rival goods

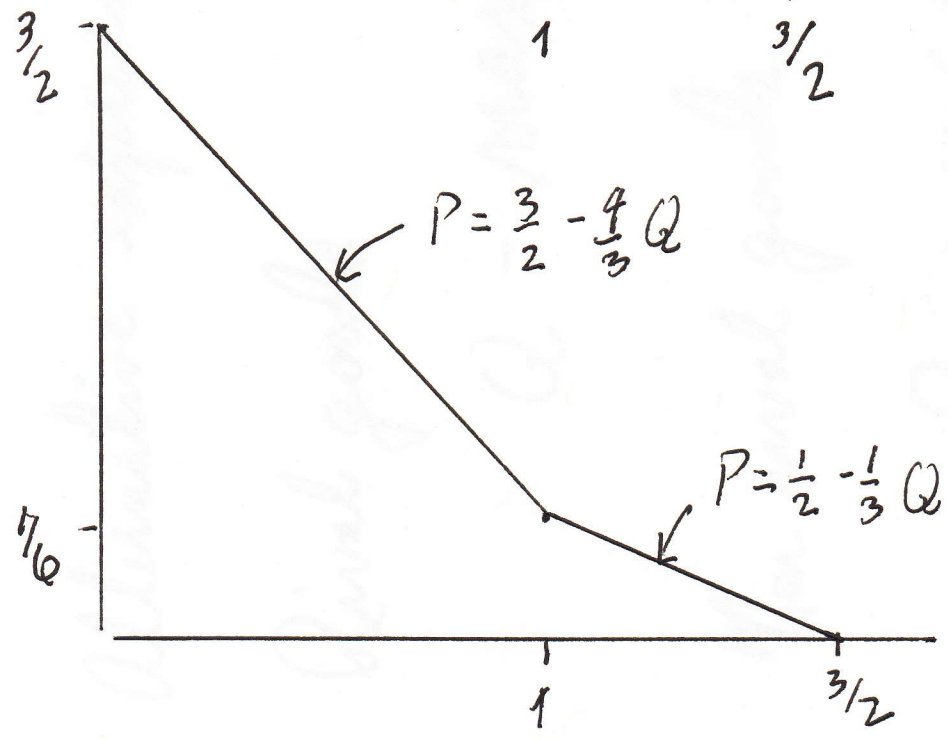
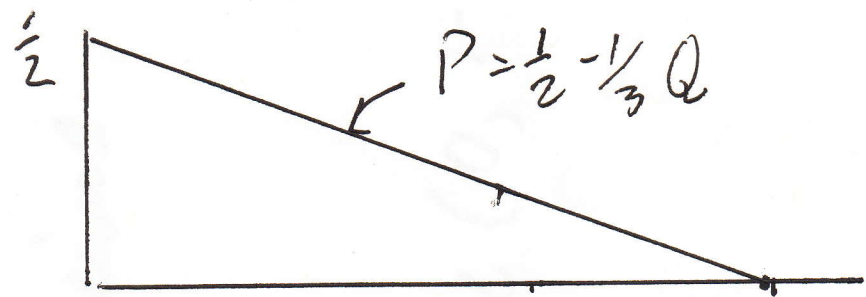
⇒ vertical sum, hold quantities fixed, add prices



$$0 \leq Q \leq 1 \Rightarrow P = 1 - Q + \frac{1}{2} - \frac{1}{3}Q$$

$$\Rightarrow P = \frac{3}{2} - \frac{4}{3}Q$$

$$1 \leq Q \leq \frac{3}{2} \Rightarrow P = \frac{1}{2} - \frac{1}{3}Q$$



Critical assumption:  
Both groups receive the same quantity

## Alternative expressions

### Rival goods

$$Q = \max(0, 1-P) + \max(0, \frac{3}{2} - 3P)$$

### Non rival goods

$$P = \max(0, 1-Q) + \max(0, \frac{1}{2} - \frac{1}{3}Q)$$