Numerical Example

Two buyers:

A $\quad WTP_A = 20 - 2Q_A$

B $\quad WTP_B = 20 - Q_B$

Graphing person A's WTP:
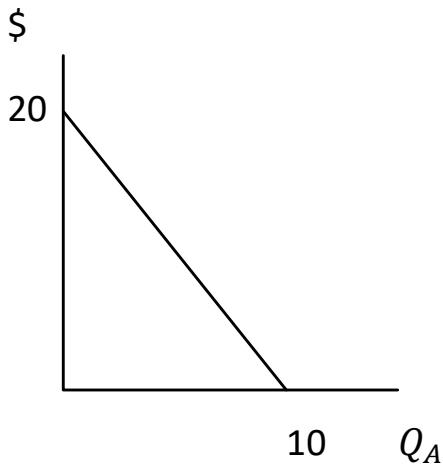
$\$$

20

10 $\quad Q_A$

Intercepts:

Axis	Rule	Solving
Y	$Q_A = 0$	$WTP_A = 20 - 2*0$ $WTP_A = $ 20
X	$WTP_A = 0$	$0 = 20 - 2Q_A$ $Q_A = $ 10

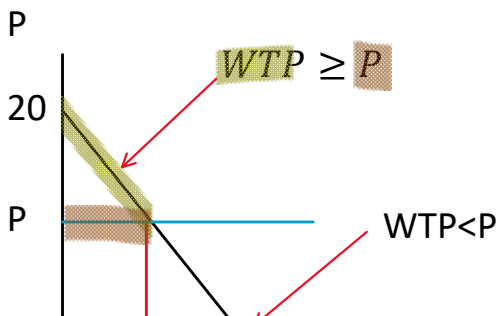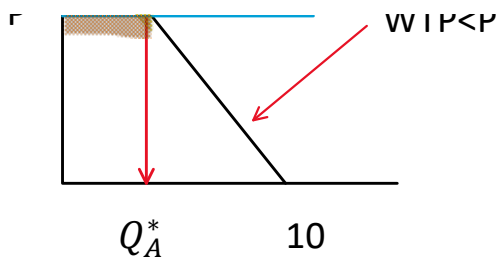For each price P, how much will person A buy, Q_A^*?

Recall decision rules:
    Buy if WTP$_A$ ≥ P
    Don't buy if WTP$_A$ < P

Result: Q_A^* is where WTP crosses P:
    $WTP_A(Q_A^*) = P$

P

$WTP \geq P$

20

P

WTP<P

WTP<P

Q_A^* 10

Can use to derive A's demand equation $Q_A^D(P)$

WTP equation: $WTP_A = 20 - 2Q_A$

Decision rule: $WTP_A = P$

Eliminating WTP_A by substitution:

$$P = 20 - 2Q_A$$

Solving for Q_A:

$$P = 20 - 2Q_A$$

$$P - 20 = -2Q_A$$

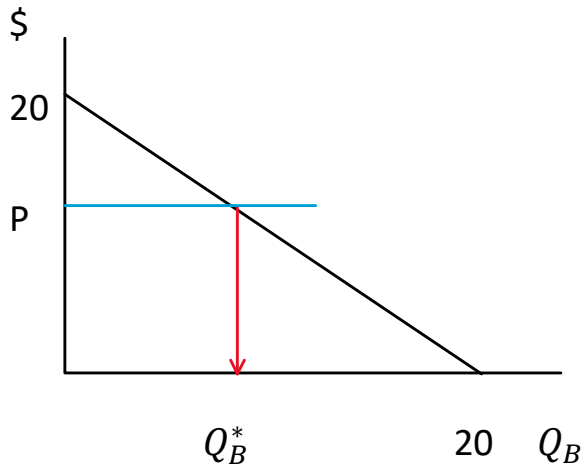$$\frac{P - 20}{-2} = Q_A$$

$$Q_A = 10 - \frac{1}{2}P$$

Thus A's demand is:

$$Q_A^D = 10 - \frac{1}{2}P$$

Person B's demand?

$$WTP_B = 20 - Q_B$$

WTP equation: $WTP_B = 20 - Q_B$
Decision rule: $WTP_B = P$

Solving for Q_B:

$$P = 20 - Q_B$$

$$Q_B = 20 - P$$

Thus B's demand is:

$$Q_B^D = 20 - P$$

Practice deriving demand from WTP:

Economic Skills Project exercise MD-101
https://wilcoxen.maxwell.insightworks.com/esp/md101/
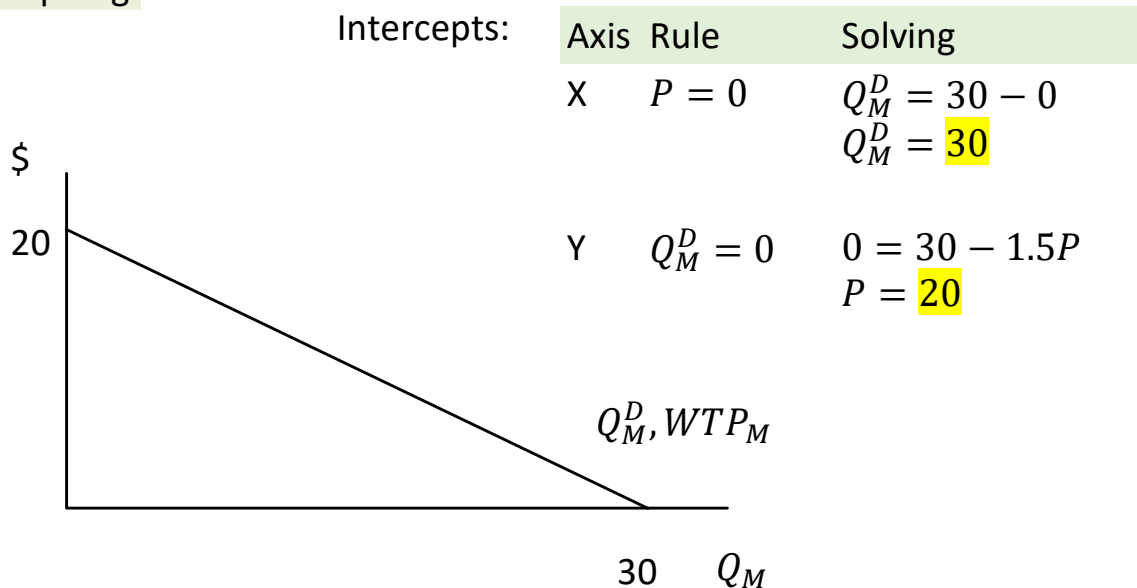
Finding the market demand:

$$Q_M^D = \sum_i^N Q_i^D$$

$$Q_M^D = Q_A^D + Q_B^D$$

$$Q_M^D = \left(10 - \frac{1}{2}P\right) + (20 - P)$$

$$\boxed{Q_M^D = 30 - \frac{3}{2}P}$$

Graphing:

Intercepts:

Axis	Rule	Solving
X	$P = 0$	$Q_M^D = 30 - 0$ $Q_M^D = $ 30
Y	$Q_M^D = 0$	$0 = 30 - 1.5P$ $P = $ 20

Q_M^D, WTP_M

$ Q_M$

Practice deriving market demand:

Economic Skills Project exercise MD-151
https://wilcoxen.maxwell.insightworks.com/esp/md151/

Daily exercise