Deriving Demand Equations

Key application of the model of choice

Example: popcorn and movies

Preferences:

$$\frac{Q_p}{Q_m} = \frac{2}{1}$$

$$Q_p = 2Q_m$$

Budget constraint:

$$P_p Q_p + P_m Q_m = M$$

Now leave *prices* and *M* as ***variables***

Substituting in the preference equation:

$$P_p \boldsymbol{Q_p} + P_m Q_m = M$$

$$P_p(\mathbf{2}\boldsymbol{Q_m}) + P_m Q_m = M$$

$$2P_p \boldsymbol{Q_m} + P_m \boldsymbol{Q_m} = M$$

Factoring out Q_m:

$$(2P_p + P_m)\boldsymbol{Q_m} = M$$

Solving for Q_m gives the **demand equation** for **movies**:

$$Q_m = \frac{M}{2P_p + P_m}$$

Q as a function of **M** and **prices**: $Q_m(M, P_p, P_m)$

Also know:

$$Q_p = 2Q_m$$

Substituting for Q_m gives **popcorn demand**:

$$Q_p = 2Q_m = 2\left(\frac{M}{2P_p + P_m}\right)$$

$$Q_p = \frac{2M}{2P_p + P_m}$$

Q as a function of **M** and **prices**: $Q_p\left(M, P_p, P_m\right)$

Collecting the demands:

$$Q_m = \frac{M}{2P_p + P_m} \qquad\qquad Q_p = \frac{2M}{2P_p + P_m}$$

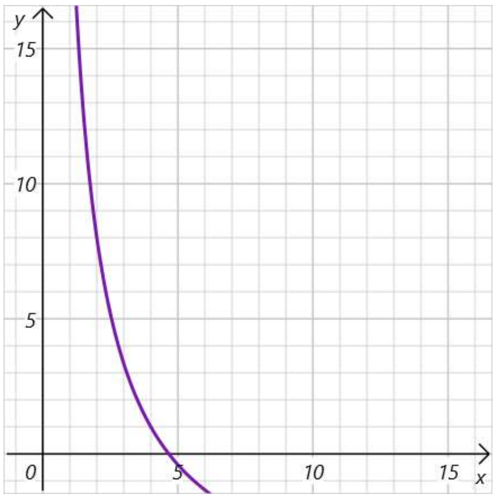
Can plot Q_m as a function of P_m for given M, P_p:

Case 1

$M = \$28$

$P_p = \$3$

$$Q_m = \frac{\$28}{2 * \$3 + P_m}$$



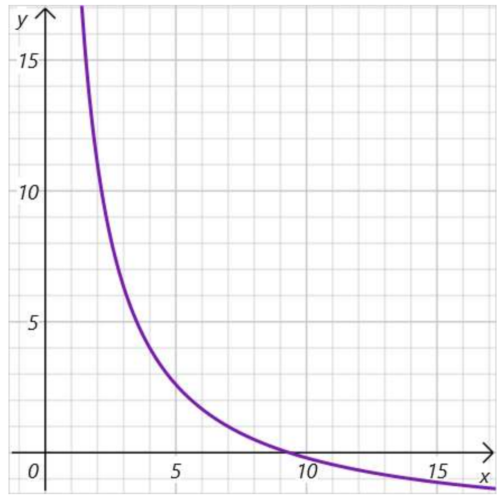
Intercept: $Q_m = 4\frac{2}{3}$

Case 2

$M = \$28$

$P_p = \$1$

$$Q_m = \frac{\$28}{2 * \$1 + P_m}$$



Intercept: $Q_m = 9\frac{1}{3}$