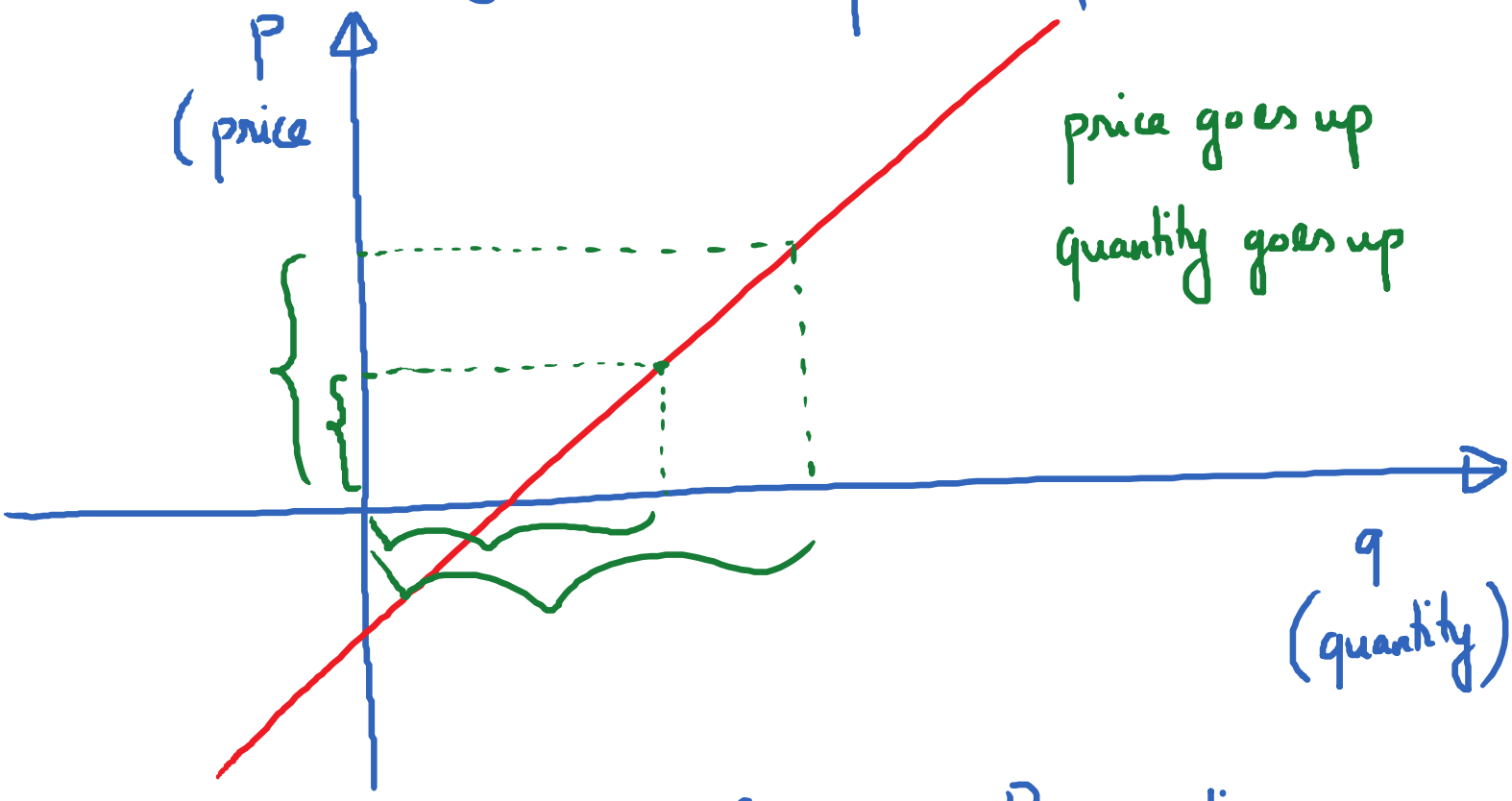
Application

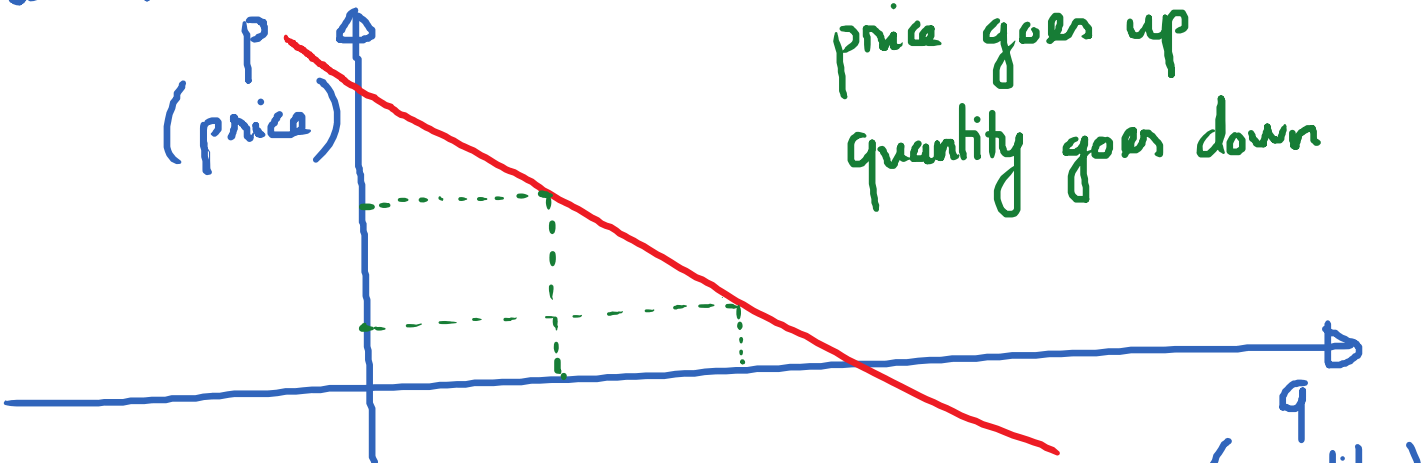
Wednesday, September 20, 2017 1:03 PM

Supply and Demand

Linear Supply Curve : From the supplier point of view.

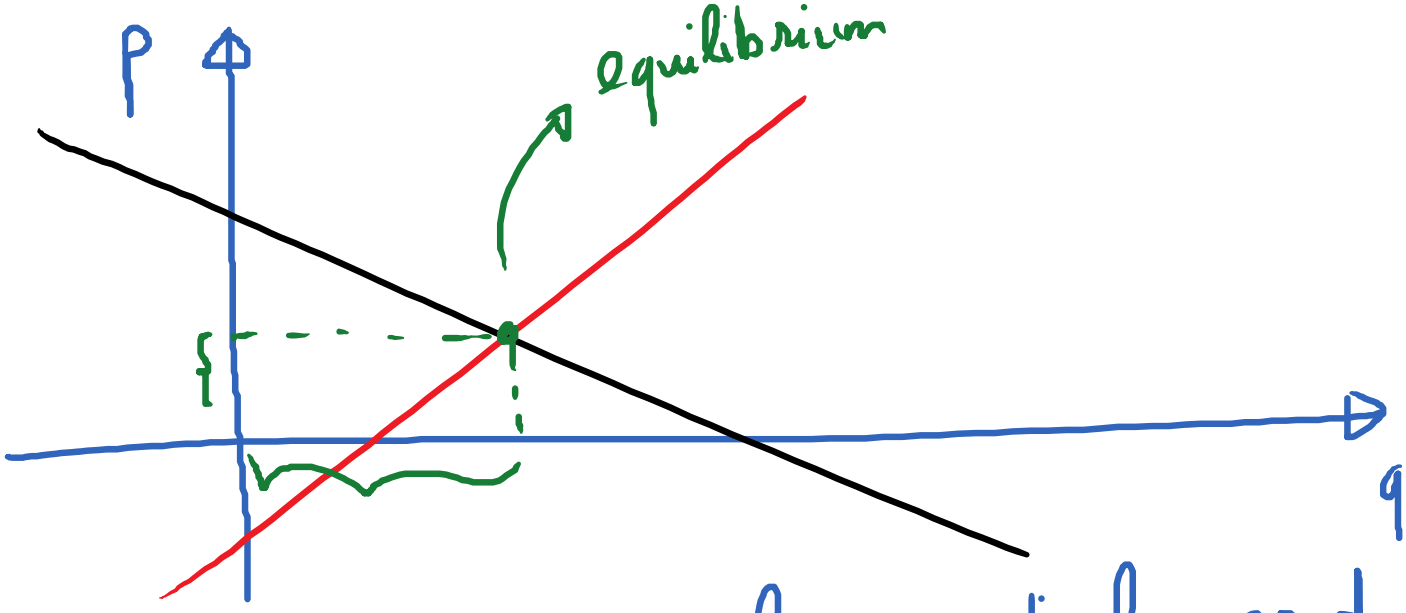


Linear Demand Curve: Consumer Perspective




q
(quantity)

Equilibrium → the point where supply and demand meet.



E.g. Supply equation for a particular product is $p = 1.04q - 7.03$

(q is in thousands of units)

Demand equation for that same product is $p = -0.81q + 7.5$

Q: Find the equilibrium point (Round to 1 decimal place)

$$\begin{cases} p = 1.04q - 7.03 \\ p = -0.81q + 7.5 \end{cases}$$

Solve.

$$-0.81q + 7.5 = 1.04q - 7.03$$

$$7.5 + 7.03 = 1.04q + 0.81q$$

$$14.53 = 1.85q$$

$$q = \frac{14.53}{1.85} \approx 7.9$$

$$p = 1.04 \cdot (7.9) - 7.03 = 1.2$$

Equilibrium $(1.2, 7.9)$

E.g. Animals in a clinic need to be kept in a strict diet.

Each animal should receive exactly 35 grams of protein and 5 grams of fat.

lab technician is able to find 2 types of food mixes: Type A and Type B

Mix A: has 20% protein and 8% fat

Mix B: has 40% protein and 4% fat.

Q: How many grams of each mix should be used to obtain the correct diet for the animal.

Sol: Amount of mix A to be used: x

Amount of mix B to be used: y.

Total amount of protein: $0.2x + 0.4y = 35$.

Total amount of fat: $0.08x + 0.04y = 5$.

So, we have $\begin{cases} 0.2x + 0.4y = 35 \\ 0.08x + 0.04y = 5 \end{cases}$

Solve for x and y.

$$\begin{cases} 0.2x + 0.4y = 35 \\ -0.8x - 0.4y = -50 \end{cases} \quad \text{Add}$$

$$-0.6x = -15$$

$$x = \frac{-15}{-0.6} = 25 \text{ g}$$

$$0.2 \cdot (25) + 0.4 \cdot y = 35$$

$$5 + 0.4y = 35$$

$$0.4y = 30$$

$$y = \frac{30}{0.4} = 75 \text{ g}$$