

Exercise 2: Supply and Demand

An economist uses as a model for the demand of a product:

$$Q_d = -2p + 300$$

where p is the price of one unit, in dirhams and Q_d is the quantity demanded, in units.

The model used for the supply of the same product is:

$$Q_s = 3p + 50$$

where p is the price of one unit, in dollars and Q_s is the quantity supplied, in units.

- (a) Economists call the price where supply is equal to demand the “equilibrium price.”

$$Q_d = Q_s$$

Find algebraically the equilibrium price.

$$Q_d = -2p + 300 \quad (1)$$

$$Q_s = 3p + 50 \quad (2)$$

We solve this system algebraically. Substituting from (2) in (1)

$$-2p + 300 = 3p + 50$$

$$5p = 250$$

$$p = \$50$$

- (b) Find the equilibrium quantity.

Substituting $p = 50$ in (1)

$$Q_d = -2p + 300 = -2 \times 50 + 300$$

$$Q_d = Q_s = 200 \text{ units}$$

- (c) If the price is \$20, which is greater, quantity demanded or supplied, and by how much?

For $p = 20$

$$\begin{aligned} \text{Quantity demanded: } Q_d &= -2p + 300 = -2 \times 20 + 300 \\ &= 260 \text{ units} \end{aligned}$$

$$\begin{aligned} \text{Quantity supplied: } Q_s &= 3p + 50 = 3 \times 20 + 50 \\ &= 110 \text{ units} \end{aligned}$$

Quantity demanded is larger by $260 - 110 = 150$ units. There is a shortage of 150 units.