

Ch 1.5: Supply and Demand

Cardboard Puzzles

Supply
 $y = S(x) = 60x - 120$

Demand
 $y = D(x) = 480 - 40x$

(a) $S(4) = 60(4) - 120 = 120$ puzzles produced by suppliers
 $D(4) = 480 - 40(4) = 320$ puzzles demanded by consumers
Demand exceeds supply

(b) $S(7) = 60(7) - 120 = 300$ puzzles produced
 $D(7) = 480 - 40(7) = 200$ puzzles purchased
Supply exceeds demand

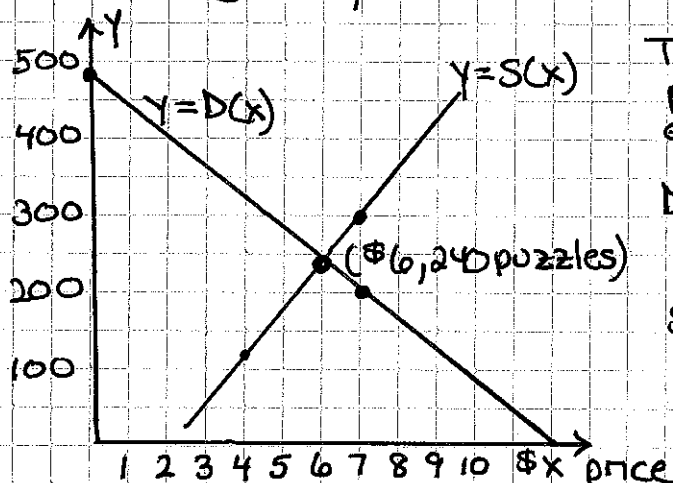
(c) Equilibrium

$$\begin{aligned} S(x) &= D(x) \\ 60x - 120 &= 480 - 40x \\ 100x &= 600 \\ x &= \frac{600}{100} = \$6 \end{aligned}$$

$$\begin{aligned} D(6) &= 480 - 40(6) = 240 \text{ puzzles} \\ S(6) &= 60(6) - 120 = 240 \text{ puzzles} \end{aligned}$$

When the price is \$6, supply and demand are in equilibrium. 240 puzzles are produced by suppliers and bought by producers

(d) Graph



To graph the lines
pick 2 points on
each line

$$\begin{aligned} D(x): \quad x=0 \quad D(0) &= 480 \\ x=7 \quad D(7) &= 200 \end{aligned}$$

$$\begin{aligned} S(x): \quad x=7 \quad S(7) &= 300 \\ x=4 \quad S(4) &= 120 \end{aligned}$$

(e) For every \$1 increase in price, the number of puzzles suppliers produce increases by 60 puzzles.

(f) For every \$1 increase in price, the number of puzzles consumers are willing to purchase decreases by 40 puzzles.

Ch 1.5: Supply and Demand

Wooden Puzzles

Supply

$$y = S(x) = 80x - 900$$

Demand

$$y = D(x) = 1200 - 70x$$

x = price

y = number of puzzles

① $S(15) = 80(15) - 900 = 1200 - 900 = 300$ puzzles produced
 $D(15) = 1200 - 70(15) = 1200 - 1050 = 150$ puzzles purchased
Supply exceeds demand

② $S(12) = 80(12) - 900 = 960 - 900 = 60$ puzzles produced
 $D(12) = 1200 - 70(12) = 1200 - 840 = 360$ puzzles purchased
Demand exceeds supply

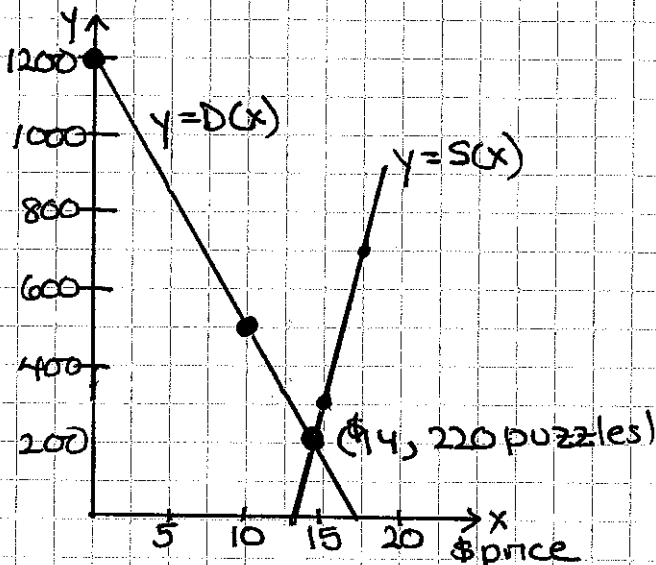
③ Equilibrium

$$\begin{aligned} S(x) &= D(x) \\ 80x - 900 &= 1200 - 70x \\ 150x &= 2100 \\ x &= \frac{2100}{150} = \$14 \end{aligned}$$

$$\begin{aligned} D(14) &= 1200 - 70(14) = 220 \text{ puzzles} \\ S(14) &= 80(14) - 900 = 220 \text{ puzzles} \end{aligned}$$

When the price is \$14, supply and demand are in equilibrium. 220 puzzles are produced by suppliers and bought by consumers.

④ Graph



To graph the lines
pick 2 points on
each line

$$\begin{aligned} D(x): x=0 \quad D(0) &= 1200 \\ x=10 \quad D(10) &= 500 \end{aligned}$$

$$\begin{aligned} S(x): x=15 \quad S(15) &= 300 \\ x=20 \quad S(20) &= 700 \end{aligned}$$

⑤ For every \$1 increase in price, suppliers are willing to produce 80 additional puzzles

⑥ For every \$1 increase in price, consumers are willing to purchase 70 fewer puzzles.