ECN 2101 Exam 1 additional practice

1. Determine the equilibrium price and quantity if the quantity demanded is:

$$Q_d = 1,450 - 14P$$

and the quantity supplied is:

$$Q_s = 50 + 2P$$

2. Determine the equilibrium price and quantity if the quantity demanded is:

$$Q_d = 1,120 - 11P$$

and the quantity supplied is:

$$Q_s = 12 + 4P$$

3. Determine the equilibrium price and quantity if the quantity demanded is:

$$Q_d = 860 - 8P$$

and the quantity supplied is:

$$Q_s = 60 + 3P$$

4. Determine the equilibrium price and quantity if the quantity demanded is:

$$Q_d = 430 - 4P$$

and the quantity supplied is:

$$Q_s = 43 + 5P$$

5. Determine the equilibrium price and quantity if the quantity demanded is:

$$Q_d = 819 - 3P$$

and the quantity supplied is:

$$Q_s = 82 + 9P$$

6. Determine the equilibrium price and quantity if the quantity demanded is:

$$Q_d = 174 - 17P$$

and the quantity supplied is:

$$Q_s = 19 + 6P$$

7. Determine the equilibrium price and quantity if the quantity demanded is:

$$Q_d = 632 - 32P$$

and the quantity supplied is:

$$Q_s = 325 + 10P$$

8. Determine the equilibrium price and quantity if the quantity demanded is:

$$Q_d = 299 - 9P$$

and the quantity supplied is:

$$Q_s = 172 + 4P$$

9. Find the elasticity between these two points on a demand curve:
$P_1 = 20; Q_1 = 200;$
$P_2 = 18; Q_2 = 300.$

10. Find the elasticity between these two points on a demand curve:
$P_1 = 30; Q_1 = 360;$
$P_2 = 24; Q_2 = 380.$

11. Find the elasticity between these two points on a demand curve:
$P_1 = 10; Q_1 = 180;$
$P_2 = 2; Q_2 = 210.$

12. Find the elasticity between these two points on a demand curve:
$P_1 = 50; Q_1 = 520;$
$P_2 = 40; Q_2 = 600.$

13. Find the elasticity between these two points on a demand curve:
$P_1 = 100; Q_1 = 170;$
$P_2 = 95; Q_2 = 180.$

14. Find the elasticity between these two points on a demand curve:
    $P_1 = 80$; $Q_1 = 890$;
    $P_2 = 60$; $Q_2 = 1,280$.

15. Find the elasticity between these two points on a demand curve:
    $P_1 = 40$; $Q_1 = 260$;
    $P_2 = 36$; $Q_2 = 915$.

16. Find the elasticity between these two points on a demand curve:
    $P_1 = 80$; $Q_1 = 300$;
    $P_2 = 60$; $Q_2 = 400$.

Answers

1. Quantity demanded is:

$$Q_d = 1,450 - 14P$$

and the quantity supplied is:

$$Q_s = 50 + 2P$$

Set the quantity demanded equal to the quantity supplied:

$$1,450 - 14P = 50 + 2P$$

$$1,450 - 50 = 2P + 14P$$

$$1,400 = 16P$$

$$P = 1,400/16$$

$$P = 87.50, \quad Q = 1,450 - 14 \times 87.50 = 225.0$$

2. Quantity demanded is:

$$Q_d = 1,120 - 11P$$

and the quantity supplied is:

$$Q_s = 12 + 4P$$

Set the quantity demanded equal to the quantity supplied:

$$1,120 - 11P = 12 + 4P$$

$$1,120 - 12 = 4P + 11P$$

$$1,108 = 15P$$

$$P = 1,108/15$$

$$P = 73.87, \quad Q = 1,120 - 11 \times 73.87 = 307.5$$

3. Quantity demanded is:

$$Q_d = 860 - 8P$$

and the quantity supplied is:

$$Q_s = 60 + 3P$$

Set the quantity demanded equal to the quantity supplied:

$$860 - 8P = 60 + 3P$$

$$860 - 60 = 3P + 8P$$

$$800 = 11P$$

$$P = 800/11$$

$$P = 72.73, \quad Q = 860 - 8 \times 72.73 = 278.2$$

4. Quantity demanded is:

$$Q_d = 430 - 4P$$

and the quantity supplied is:

$$Q_s = 43 + 5P$$

Set the quantity demanded equal to the quantity supplied:

$$430 - 4P = 43 + 5P$$

$$430 - 43 = 5P + 4P$$

$$387 = 9P$$

$$P = 387/9$$

$$P = 43.00, \quad Q = 430 - 4 \times 43.00 = 258.0$$

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5. Quantity demanded is:

$$Q_d = 819 - 3P$$

and the quantity supplied is:

$$Q_s = 82 + 9P$$

Set the quantity demanded equal to the quantity supplied:

$$819 - 3P = 82 + 9P$$

$$819 - 82 = 9P + 3P$$

$$737 = 12P$$

$$P = 737/12$$

$$P = 61.42, \quad Q = 819 - 3 \times 61.42 = 634.8$$

6. Quantity demanded is:

$$Q_d = 174 - 17P$$

and the quantity supplied is:

$$Q_s = 19 + 6P$$

Set the quantity demanded equal to the quantity supplied:

$$174 - 17P = 19 + 6P$$

$$174 - 19 = 6P + 17P$$

$$155 = 23P$$

$$P = 155/23$$

$$P = 6.74, \quad Q = 174 - 17 \times 6.74 = 59.4$$

7. Quantity demanded is:

$$Q_d = 632 - 32P$$

and the quantity supplied is:

$$Q_s = 325 + 10P$$

Set the quantity demanded equal to the quantity supplied:

$$632 - 32P = 325 + 10P$$

$$632 - 325 = 10P + 32P$$

$$307 = 42P$$

$$P = 307/42$$

$$P = 7.31, \quad Q = 632 - 32 \times 7.31 = 398.1$$

8. Quantity demanded is:

$$Q_d = 299 - 9P$$

and the quantity supplied is:

$$Q_s = 172 + 4P$$

Set the quantity demanded equal to the quantity supplied:

$$299 - 9P = 172 + 4P$$

$$299 - 172 = 4P + 9P$$

$$127 = 13P$$

$$P = 127/13$$

$$P = 9.77, \quad Q = 299 - 9 \times 9.77 = 211.1$$

9. $P_1 = 20;\ Q_1 = 200;$
   $P_2 = 18;\ Q_2 = 300.$

$$\text{midpoint\ \ quantity} = \frac{200 + 300}{2} = 250$$

$$\text{midpoint\ \ price} = \frac{20 + 18}{2} = 19$$

elasticity equals:

$$\frac{\frac{300-200}{250}}{\frac{18-20}{19}}$$

$$= \frac{\frac{100}{250}}{\frac{-2}{19}}$$

$$= \frac{100 \times 19}{250 \times (-2)}$$

$$= \frac{1,900}{-500}$$

Take the absolute value:

$$= 3.800$$

10. $P_1 = 30;\ Q_1 = 360;$
    $P_2 = 24;\ Q_2 = 380.$

$$\text{midpoint\ \ quantity} = \frac{360 + 380}{2} = 370$$

$$\text{midpoint\ \ price} = \frac{30 + 24}{2} = 27$$

elasticity equals:

$$\frac{\frac{380-360}{370}}{\frac{24-30}{27}}$$

$$=\frac{\frac{20}{370}}{\frac{-6}{27}}$$

$$=\frac{20\times27}{370\times(-6)}$$

$$=\frac{540}{-2,220}$$

Take the absolute value:

$$=0.243$$

11. $P_1=10$; $Q_1=180$;
    $P_2=2$; $Q_2=210$.

$$\text{midpoint quantity}=\frac{180+210}{2}=195$$

$$\text{midpoint price}=\frac{10+2}{2}=6$$

elasticity equals:

$$\frac{\frac{210-180}{195}}{\frac{2-10}{6}}$$

$$=\frac{\frac{30}{195}}{\frac{-8}{6}}$$

$$=\frac{30\times6}{195\times(-8)}$$

$$= \frac{180}{-1,560}$$

Take the absolute value:

$$= 0.115$$

12. $P_1 = 50;\ Q_1 = 520;$
    $P_2 = 40;\ Q_2 = 600.$

$$\text{midpoint quantity} = \frac{520 + 600}{2} = 560$$

$$\text{midpoint price} = \frac{50 + 40}{2} = 45$$

elasticity equals:

$$\frac{\frac{600-520}{560}}{\frac{40-50}{45}}$$

$$= \frac{\frac{80}{560}}{\frac{-10}{45}}$$

$$= \frac{80 \times 45}{560 \times (-10)}$$

$$= \frac{3,600}{-5,600}$$

Take the absolute value:

$$= 0.643$$

13. $P_1 = 100;\ Q_1 = 170;$
$P_2 = 95;\ Q_2 = 180.$

$$\text{midpoint\ \ quantity} = \frac{170 + 180}{2} = 175$$

$$\text{midpoint\ \ price} = \frac{100 + 95}{2} = 97.5000$$

elasticity equals:

$$\frac{\frac{180-170}{175}}{\frac{95-100}{97.5000}}$$

$$= \frac{\frac{10}{175}}{\frac{-5}{97.5000}}$$

$$= \frac{10 \times 97.5000}{175 \times (-5)}$$

$$= \frac{975}{-875}$$

Take the absolute value:

$$= 1.114$$

14. $P_1 = 80;\ Q_1 = 890;$
$P_2 = 60;\ Q_2 = 1,280.$

$$\text{midpoint\ \ quantity} = \frac{890 + 1,280}{2} = 1,085$$

$$\text{midpoint\ \ price} = \frac{80 + 60}{2} = 70$$

elasticity equals:

$$\frac{\frac{1,280-890}{1,085}}{\frac{60-80}{70}}$$

$$= \frac{\frac{390}{1,085}}{\frac{-20}{70}}$$

$$= \frac{390 \times 70}{1,085 \times (-20)}$$

$$= \frac{27,300}{-21,700}$$

Take the absolute value:

$$= 1.258$$

15. $P_1 = 40$; $Q_1 = 260$;
$P_2 = 36$; $Q_2 = 915$.

$$\text{midpoint quantity} = \frac{260 + 915}{2} = 587.5000$$

$$\text{midpoint price} = \frac{40 + 36}{2} = 38$$

elasticity equals:

$$\frac{\frac{915-260}{587.5000}}{\frac{36-40}{38}}$$

$$= \frac{\frac{655}{587.5000}}{\frac{-4}{38}}$$

$$= \frac{655 \times 38}{587.5000 \times (-4)}$$

$$= \frac{24,890}{-2,350}$$

Take the absolute value:

$$= 10.591$$

16. $P_1 = 80$; $Q_1 = 300$;
$P_2 = 60$; $Q_2 = 400$.

$$\text{midpoint quantity} = \frac{300 + 400}{2} = 350$$

$$\text{midpoint price} = \frac{80 + 60}{2} = 70$$

elasticity equals:

$$\frac{\frac{400-300}{350}}{\frac{60-80}{70}}$$

$$= \frac{\frac{100}{350}}{\frac{-20}{70}}$$

$$= \frac{100 \times 70}{350 \times (-20)}$$

$$= \frac{7,000}{-7,000}$$

Take the absolute value:

$$= 1.000$$