201-SH3-AB - Exercises #12: Consumer and Producer Surplus

(1) The demand function for a product is $p = 81 - x^2$, and the supply function is $p = x^2 + 4x + 11$. Find the equilibrium point, sketch the region whose area represents the consumer surplus, and find the consumer surplus.

(2) The demand function for a product is $p = -x^2 + 250$, and the supply function is $p = x^2 + 50$. Find the equilibrium point, sketch the region whose area represents the consumer surplus, and find the consumer surplus.

(3) The demand function for a product is $p = -x^2 + 400$, and the supply function is $p = x^2 + 34x$. Find the equilibrium point, sketch the region whose area represents the producer surplus, and find the producer surplus.

(4) The demand function for a product is $p = \dfrac{100}{\sqrt{x + 25}}$, and the supply function is $p = \sqrt{x + 25}$. Find the equilibrium point, sketch the region whose area represents the producer surplus, and find the producer surplus.

(5) The demand function for a product is $p = \dfrac{250}{x + 20}$, and the supply function is $p = x + 5$. Find the equilibrium point, sketch the region whose area represents the consumer surplus, and find the consumer surplus.

(6) The demand function for a product is $p = -x^2 + 24$, and the supply function is $p = x^2 + 2x$. Find the equilibrium point, sketch the regions whose areas represent the consumer and producer surpluses, and find the consumer and producer surpluses.

(7) The demand function for a product is $p = -x^2 + 100$, and the supply function is $p = 2x + 20$. Find the equilibrium point, sketch the regions whose areas represent the consumer and producer surpluses, and find the consumer and producer surpluses.

(8) The demand function for a product is $p = -x^2 + 100$, and the supply function is $p = 3x + 30$. Find the equilibrium point, sketch the regions whose areas represent the consumer and producer surpluses, and find the consumer and producer surpluses.

(9) The demand function for a product is $p = 144 - x^2$, and the supply function is $p = 48 + \frac{1}{2}x^2$. Find the equilibrium point, sketch the regions whose areas represent the consumer and producer surpluses, and find the consumer and producer surpluses.

(10) The demand function for a product is $p = -0.2x^2 + 80$, and the supply function is $p = 0.1x^2 + x + 40$. Find the equilibrium point, sketch the regions whose areas represent the consumer and producer surpluses, and find the consumer and producer surpluses.

(11) The demand function for a product is $p = \dfrac{12}{x + 3}$, and the supply function is $p = x + 2$. Find the equilibrium point, sketch the regions whose areas represent the consumer and producer surpluses, and find the consumer and producer surpluses.

(12) The demand function for a product is $p = \dfrac{25}{\sqrt{x + 16}}$, and the supply function is $p = \sqrt{x + 16}$. Find the equilibrium point, sketch the regions whose areas represent the consumer and producer surpluses, and find the consumer and producer surpluses.

(13) The demand function for a product is $p = \sqrt{9 - 0.02x}$, and the supply function is $p = \sqrt{1 + 0.02x}$. Find the equilibrium point, sketch the regions whose areas represent the consumer and producer surpluses, and find the consumer and producer surpluses.

ANSWERS:

(1) E=$(5, 56)$, CS=\$83.33

(2) E=$(10, 150)$, CS=\$666.67

(3) E=$(8, 336)$, PS=\$1429.33

(4) E=$(75, 10)$, PS=\$166.67

(5) E=$(5, 10)$, CS=\$5.79

(6) E=$(3, 15)$, CS=\$18, PS=\$27

(7) E=$(8, 36)$, CS=\$341.33, PS=\$64

(8) E=$(7, 51)$, CS=\$228.67, PS=\$73.50

(9) E=$(8, 80)$, CS=\$341.33, PS=\$170.67

(10) E=$(10, 60)$, CS=\$133.33, PS=\$116.67

(11) E=$(1, 3)$, CS=\$0.45, PS=\$0.50

(12) E=$(9, 5)$, CS=\$5.00, PS=\$4.33

(13) E=$(200, 2.24)$, CS=\$79.32, PS=\$108.66