201-203-RE - Practice Set #13: Consumer and Producer Surplus

(1) The demand function for a product is $p = \sqrt{1225 - 0.15x}$. If the equilibrium price is $25, sketch the region whose area represents the consumer surplus, and find the consumer surplus.

(2) The demand function for a product is $p = 34 - x^2$. If the equilibrium price is $9, sketch the region whose area represents the consumer surplus, and find the consumer surplus.

(3) The supply function for a product is $p = 0.06x^2 + 10x + 3$. If the equilibrium quantity is 10 units, sketch the region whose area represents the producer surplus, and find the producer surplus.

(4) The demand function for a product is $p = 1000e^{-0.01x}$. If the equilibrium quantity is 25 units, sketch the region whose area represents the consumer surplus, and find the consumer surplus.

(5) The supply function for a product is $p = 0.08x^3 + 100$. If the equilibrium quantity is 20 units, sketch the region whose area represents the producer surplus, and find the producer surplus.

(6) The demand function for a product is $p = \dfrac{100}{10 + 0.05x}$. If the equilibrium quantity is 200 units, sketch the region whose area represents the consumer surplus, and find the consumer surplus.

(7) The supply function for a product is $p = 100\sqrt{4 + 3x}$. If the equilibrium quantity is 4 units, sketch the region whose area represents the producer surplus, and find the producer surplus.

(8) The supply function for a product is $p = 4x^2 + 2x + 2$. If the equilibrium price is $422, sketch the region whose area represents the producer surplus, and find the producer surplus.

(9) The demand function for a product is $p = \dfrac{200}{x + 2}$. If the equilibrium quantity is 8 units, sketch the region whose area represents the consumer surplus, and find the consumer surplus.

(10) The supply function for a product is $p = 10e^{x/3}$. If the equilibrium quantity is 15 units, sketch the region whose area represents the producer surplus, and find the producer surplus.

(11) 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.

(12) The supply function for a product is $p = 0.01x^3 + 50$. If the equilibrium quantity is 5 units, sketch the region whose area represents the producer surplus, and find the producer surplus.

(13) 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.

(14) 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.

(15) 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.

(16) 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.

(17) 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.

(18) 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.

(19) 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.

ANSWERS:

(1) $21111.11

(2) $83.33

(3) $540

(4) $2649.90

(5) $9600

(6) $386.29

(7) $355.56

(8) $2766.67

(9) $161.89

(10) $17839.58

(11) E=$(5, 56)$, CS=$83.33

(12) $4.69

(13) E=$(10, 150)$, CS=$666.67

(14) E=$(8, 336)$, PS=$1429.33

(15) E=$(75, 10)$, PS=$166.67

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

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

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

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