

### 201-203-RE - Supplement C - 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  $p = \frac{100}{10 + 0.05x}$ . 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  $p = \frac{200}{x + 2}$ . 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  $p = \frac{100}{\sqrt{x + 25}}$ , 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  $p = \frac{250}{x + 20}$ , 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.

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