

201-203-RE - Supplement B - 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.

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