

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 $p = \frac{100}{\sqrt{x+25}}$, 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.
- (5) 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.
- (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 $p = \frac{12}{x+3}$, 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 $p = \frac{25}{\sqrt{x+16}}$, 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:

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| (1) $E=(5, 56)$, $CS=\$83.33$ | (8) $E=(7, 51)$, $CS=\$228.67$, $PS=\$73.50$ |
| (2) $E=(10, 150)$, $CS=\$666.67$ | (9) $E=(8, 80)$, $CS=\$341.33$, $PS=\$170.67$ |
| (3) $E=(8, 336)$, $PS=\$1429.33$ | (10) $E=(10, 60)$, $CS=\$133.33$, $PS=\$116.67$ |
| (4) $E=(75, 10)$, $PS=\$166.67$ | (11) $E=(1, 3)$, $CS=\$0.45$, $PS=\$0.50$ |
| (5) $E=(5, 10)$, $CS=\$5.79$ | (12) $E=(9, 5)$, $CS=\$5.00$, $PS=\$4.33$ |
| (6) $E=(3, 15)$, $CS=\$18$, $PS=\$27$ | (13) $E=(200, 2.24)$, $CS=\$79.32$, $PS=\$107.87$ |
| (7) $E=(8, 36)$, $CS=\$341.33$, $PS=\$64$ | |