
Version B

I. Multiple choice

- (1)d. (2)b. (3)d. (4)d. (5)c. (6)b. (7)e. (8)d. (9)a. (10)b.
(11)e. (12)b. (13)a. (14)b. (15)e.

II. Short answer

- (2) a. increase b. 6 units, using derivatives since changes are given in units.
(1) a. increase b. 5 percent, using elasticity since change is given in percent.
(3) a. decrease b. 4 percent, using approximation rule for products.
(4) a. decrease b. 2 percent, using approximation rule for ratios.
(5) a. increase b. 24 units c. decrease d. 8 units.
(6) a. down b. slope = $-\frac{\partial y/\partial x_2}{\partial y/\partial x_1} = -\frac{3}{5}$.

III. Problems

- (1) a. $dy/dx = -x - 10$. b. Set $dy/dx=0$ and solve to get $x^* = -10$.
c. The function slopes up if $dy/dx = -x - 10 > 0$, which implies $-10 > x$.
The function slopes down if $dy/dx = -x - 10 < 0$, which implies $-10 < x$.
d. $y^* = f(x^*) = f(-10) = 57$.
- (2) a. $\varepsilon_1 = \frac{\partial y}{\partial x_1} \frac{x_1}{y} = 5x_1^4 (x_2 + 1)^4 \frac{x_1}{x_1^5 (x_2 + 1)^4} = 5$. b. $x_1^5 4(x_2 + 1)^3 \frac{x_2}{x_1^5 (x_2 + 1)^4} = \frac{4x_2}{x_2 + 1}$.
- (3) a. $\frac{\partial y}{\partial x_1} = 6 \left(\frac{1}{2}\right) x_1^{-1/2} = 3x_1^{-1/2}$ b. $\frac{\partial y}{\partial x_2} = 2 \left(\frac{1}{2}\right) x_2^{-1/2} = x_2^{-1/2}$
c. $MRS = \frac{\partial y/\partial x_2}{\partial y/\partial x_1} = \frac{x_2^{-1/2}}{3x_1^{-1/2}} = \left(\frac{1}{3}\right) \left(\frac{x_1}{x_2}\right)^{1/2}$
- (4) a. $\frac{\partial y}{\partial x_1} = 3(x_1 + 2)^2 (x_2 + 1)^4$ b. $\frac{\partial y}{\partial x_2} = (x_1 + 2)^3 4(x_2 + 1)^3$
c. $MRS = \frac{\partial y/\partial x_2}{\partial y/\partial x_1} = \frac{(x_1 + 2)^3 4(x_2 + 1)^3}{3(x_1 + 2)^2 (x_2 + 1)^4} = \frac{4(x_1 + 2)}{3(x_2 + 1)}$.

IV. Critical thinking

(Same as version A.)

[end of answer key]