

HW Questions for Chapter 8

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1. Find total differential for (a) $U = 2x_1 + 9x_1x_2 + x_2^2$.

(b) $y = \frac{2x_1x_2}{x_1 + x_2}$

(c) $y = 3x_1(2x_2 - 1)(x_2 + 5)$

2. The supply function of a certain commodity is

$$Q = a + bP^2 + R^{1/2} \quad (a < 0, b > 0) \quad R = \text{rainfall.}$$

Find the price elasticity of supply $\epsilon_{Q,P}$

(+) rainfall elasticity of supply $\epsilon_{Q,R}$

3. The foreign demand for our exports X depends on the foreign income Y_f and our price level P : $X = Y_f^{1/2} + P^{-2}$. Find the partial elasticity of foreign demand for our exports w.r.t. our price level.

4. Find the total derivative dz/dy given:

(a) $z = 6x^2 - 3xy + 2y^2$, where $x = 1/y$

(b) $z = (x+y)(x-2y)$, where $x = 2-7y$

5. Find the total derivative dz/dt given:

(a) $z = x^2 - 8xy - y^3$ where $x = 3t$, $y = 1-t$

(b) $z = 3u + vt$ where $u = 2t^2$, $v = t+1$

6. Given $F(y,x) = 2x^2 + 4xy - y^4 + 67 = 0$, is an implicit function defined around the point $(y=3, x=1)$. If yes, find $\frac{dy}{dx}$ and evaluate it at the point \uparrow

7. Given $x^2 + 3xy + 2yz + y^2 + z^2 - 11 = 0$

Is an implicit function $z = f(x,y)$ defined around

$(x=1, y=2, z=0)$? If so, find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ by

implicit-function rule, & evaluate them at that point.

8. Given the following national income model, find $\frac{\partial Y^k}{\partial I_0}$, $\frac{\partial C^k}{\partial I_0}$, $\frac{\partial G^k}{\partial I_0}$,

$$Y = C + I_0 + G$$

$$C = \alpha + \beta(Y - T_0)$$

$$G = \gamma Y$$

$$\frac{\partial Y^k}{\partial \beta}, \frac{\partial C^k}{\partial \beta}, \frac{\partial G^k}{\partial \beta}$$