

Quiz 1

Instructions:

- Please put your answers on a separate sheet of paper (or the back of this paper). If you use a separate sheet of paper, then **staple the sheets to the quiz!!!**
- You may not consult any outside materials. You may not consult with your classmates.
- You **may** use a calculator.
- You have **twenty-five** minutes to complete the quiz.
- You must show your work.

1. France produces wine. The market for wine is described by the following equations:

Demand: $Q(I, P_w, P_b) = .01I^2 + 1000P_b - 2000P_w$

Supply: $Q = -100 + 15P$

Price of wine = P_w = Euros per bottle

Price of beer = P_b = Euros per six pack

Income = I = monthly household income

Quantity = Bottles of wine

When it is appropriate, assume that households have 3000 Euros of income per month and that the price of a six-pack of beer is 10 Euros.

- a. Graph the supply and demand curves. Label your axes and the curves.
 - b. Find the equilibrium price for a bottle of wine in this market.
 - c. Calculate the price elasticity of demand and supply at the market equilibrium.
 - d. Calculate the income elasticity for wine. Is it an inferior, normal, or luxury good? How do you know this?
 - e. Calculate the cross price elasticity between wine and beer. What does this cross price elasticity tell you about the relationship between the two goods?
2. Find the partial derivative with respect to y for each of the following functions:

a. $f(x, y) = x^3 + 4y^7$

b. $f(x, y) = x^2y^4 + y$

c. $f(x, y) = x^{1/2} + y$

d. $f(x, y) = (16x + 8y^3)^4$

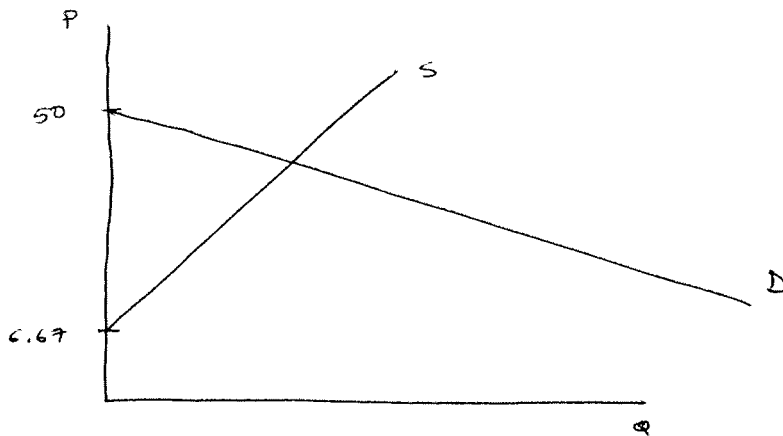
II

$$a) Q_d = 90,000 + 10,000 - 2000 P_w$$

$$Q_d = 100,000 - 2000 P_w$$

$$D: P_w = 50 - \frac{1}{2000} Q$$

$$S: P_w = 6.67 + \frac{1}{15} Q$$



b)

$$100,000 - 2000 P_w = -100 + 15 P_w$$

$$100,100 = 2015 P_w$$

$$P_w = 49.67$$

$$Q_w = 660$$

$$c) E_d = \left| -2000 \cdot \frac{49.67}{660} \right| = 150.5 \quad \text{Very elastic!}$$

$$E_s = 15 \cdot \frac{49.67}{660} = 1.1$$

1d)

$$E_I = .02I \cdot \frac{3000}{660} = 272.7 \Rightarrow \text{Luxury.}$$

$$\frac{\partial Q}{\partial I} > 0 \rightarrow \text{yields a positive } E_I.$$

$E_I > 1$ means it is a luxury good.

1e)

$$E_{x,y} = 1000 \cdot \frac{10}{660} = 15.2 \Rightarrow \text{Substitutes!}$$

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a)

$$\frac{\partial f}{\partial y} = 28y^6$$

c)

$$\frac{\partial f}{\partial y} = 1$$

b)

$$\frac{\partial f}{\partial y} = 4x^2y^3 + 1$$

d)

$$\frac{\partial f}{\partial y} = 4(16x + 8y^3)^3 \cdot 24y^2$$