Intermediate Microeconomic Analysis  (Econ 173)
Drake University, Fall 2011
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# FINAL EXAMINATION ANSWER KEY

## Version A

### I. MULTIPLE CHOICE
(1)d.   (2)e.   (3)b.   (4)c.   (5)e.   (6)a.   (7)d.   (8)a.   (9)a.   (10)a.
(11)d.  (12)d.  (13)c.  (14)e.  (15)b.  (16)a.  (17)c.  (18)c.  (19)d.  (20)a.

### II. SHORT ANSWER
(1)     a. inelastic     b. decrease     c. 4%.          d. increase     e. 1%.
(2)     a. 1000 units   b. 0 units      c. 1200 units   d. $5           e. $2.
(3)     a. 5 million gallons            b. $6           c. $3           d. decrease
        e. $12 million  f. decrease     g. $6 million   h. $15 million  i. 3 million.
(4)     a. 10 units     b. 40 units     c. $6.
(5)     a. decrease     b. 8 units of food              c. 3 units of other goods
        d. -3           e. $15.
(6)     a. ½=0.5        b. 1/20=0.05    c. 1/100=0.01.
(7)     a. 150          b. $4           c. 60 permits   d. 30 permits.
(8)     a. MSB = 40000 – 4000 Q    b. 5 miles.

### III. PROBLEMS
(1)     a. $180 = 4 q_1 + 3 q_2$        b. MRSC $= \dfrac{3q_1}{2q_2}$          c. $q_1^* = 18, q_2^* = 36$ .

(2)     a. own-price elasticity of demand = -1.5.

        Justification: $\varepsilon = \dfrac{\partial q_1{}^*}{\partial p_1} \dfrac{p_1}{q_1} = \dfrac{3(-1.5)p_1^{-2.5}p_2^{0.1}I^{1.2}\ p_1}{3p_1^{-1.5}p_2^{0.1}I^{1.2}} = -1.5$,

        Or give the rule of thumb: "This is a power function, so the exponent of $p_1$ is the own-price elasticity of demand."
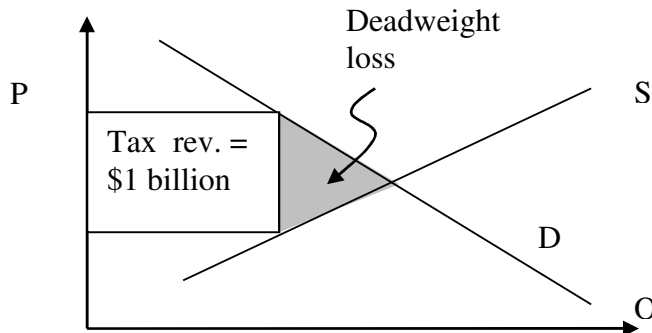
        b. $3 (a\,p_1)^{-1.5} (a\,p_2)^{0.1} (aI^{1.2}) = a^{-1.5}\,a^{0.1}\,a^{1.2}\,3\,p_1^{-1.5}\,p_2^{0.1}\,I^{1.2} = a^{-0.2}\,3\,p_1^{-1.5}\,p_2^{0.1}\,I^{1.2}$ .

        Since the  a  factors do not cancel out, this function is NOT homogeneous of degree zero in income and prices.

(3)     a. 90 units     b. $6           c. import       d. 90 units     e. increase
        f. $315         g. decrease     h. $180         i. increase     j. $135.
(4)     a. MR = 15 – (Q/25)             b. Q* = 300                     c. P* = $9
        d. profit = $1800               e. DWL = $900                   f. Q* = 600
        g. profit = $3600               h. DWL = zero under perfect price discrimination.
(5)     a. Q = 900, P = $11             b. MSB = 32 – (3Q/200)          c. Q* = 1200
        d. subsidy = $6.
(6)     a. Q** = 4000 cars             b. Q* = 2000 cars               c. fee = $5.
(7)     a. $50 thousand                b. 200 utils                    c. $40 thousand
        d. $50 thousand                e. $40 thousand.

### IV. CRITICAL THINKING

(1)　　The loss of consumer and producer surplus in this market must exceed the tax revenue collected because some mutually beneficial trades will not take place under the tax. So the loss of consumer and producer surplus must be greater than the tax revenue collected ($1 billion) and rebated to the people. There is an additional loss, called **deadweight loss**. Therefore the country is **worse off** than if the tax and rebate did not exist.



(2)　　Non-profit organizations may focus on the public good, but they still must minimize their losses. Thus they are motivated to use **market-segmenting price discrimination** to minimize losses. This means that they follow the same pricing rule as profit-making firms: $P_i = \dfrac{MC}{1+\left(1/\varepsilon_i\right)}$, where $\varepsilon_i$ denotes the elasticity of demand by the ith market segment. So if students and senior citizens have **greater elasticity of demand** (that is, if they are more sensitive to the price) than other customers, then these organizations will give these groups discount prices.

## Version B

### I. MULTIPLE CHOICE
(1)e.　(2)b.　(3)d.　(4)d.　(5)e.　(6)a.　(7)d.　(8)a.　(9)b.　(10)b.
(11)a.　(12)a.　(13)d.　(14)b.　(15)e.　(16)b.　(17)d.　(18)c.　(19)e.　(20)a.

### II. SHORT ANSWER
(1)　　a. inelastic　　b. increase　　c. 2%.　　　　d. decrease　　e. 3%.
(2)　　a. 0 units　　b. 800 units　　c. 600 units　　d. $10　　　e. $5.
(3)　　a. 3 million gallons　　　　　b. $8　　　　　c. $2　　　　　d. decrease
　　　e. $20 million　f. decrease　　g. $10 million　h. $18 million　i. 12 million.
(4)　　a. 20 units　　b. 30 units　　c. $7.
(5)　　a. decrease　　b. 6 units of food　　　　　c. 4 units of other goods
　　　d. -4　　　　　e. $20.
(6)　　a. 1/4=0.25　　b. 1/8=0.125　　c. 1/100=0.01.
(7)　　a. 150　　　　b. $6　　　　　c. 40 permits　d. 20 permits.
(8)　　a. MSB = 50000 – 5000 Q　　b. 6 miles.

### III. PROBLEMS
(1)　　a. $300 = 2\, q_1 + 8\, q_2$　　　　　b. $MRSC = \dfrac{2q_1}{q_2}$　　　　　c. $q_1{}^* = 50, q_2{}^* = 25$ .

(2)    a. own-price elasticity of demand = -1.

Justification: $\varepsilon = \dfrac{\partial q_{1}*}{\partial p_1}\dfrac{p_1}{q_1} = \dfrac{5(-1)p_1^{-2}p_2^{0.1}I}{5p_1^{-1}p_2^{0.1}I}\dfrac{p_1}{} = $ -1,

Or give the rule of thumb: "This is a power function, so the exponent of $p_1$ is the own-price elasticity of demand."

b. $5 (a\, p_1)^{-1} (a\, p_2)^{0.1} (aI) = a^{-1}\, a^{0.1}\, a^{1}\, 5\, p_1^{-1}\, p_2^{0.1}\, I = a^{0.1}\, 5\, p_1^{-1}\, p_2^{0.1}\, I$ .
Since the $a$ factors do not cancel out, this function is NOT homogeneous of degree zero in income and prices.

(3)    a. 90 units      b. $6          c. export        d. 30 units      e. decrease
       f. $85            g. increase     h. $100          i. increase      j. $15.
(4)    a. MR = 10 – (Q/50)              b. Q* = 300                    c. P* = $7
       d. profit = $900                e. DWL = $450                  f. Q* = 600
       g. profit = $1800               h. DWL = zero under perfect price discrimination.
(5)    a. Q = 900, P = $11             b. MSB = 27 – (3Q/200)        c. Q* = 1000
       d. subsidy = $2.
(6)    a. Q** = 5000 cars              b. Q* = 2500 cars              c. fee = $2.50.
(7)    a. $50 thousand                 b. 200 utils                   c. $40 thousand
       d. $50 thousand                 e. $40 thousand.

## IV. CRITICAL THINKING
(Same as Version A.)


## Version C

### I. MULTIPLE CHOICE
(1)b.    (2)a.    (3)c.    (4)a.    (5)d.    (6)a.    (7)c.    (8)a.    (9)c.    (10)a.
(11)b.   (12)a.   (13)a.   (14)c.   (15)e.   (16)b.   (17)a.   (18)a.   (19)b.   (20)b.

### II. SHORT ANSWER
(1)    a. elastic       b. increase      c. 7%.           d. increase      e. 2%.
(2)    a. 0 units       b. 1000 units    c. 800 units     d. $8            e. $3.
(3)    a. 9 million gallons              b. $2            c. $5            d. increase
       e. $16 million  f. increase       g. $8 million    h. $27 million i. 3 million.
(4)    a. 40 units      b. 10 units      c. $12.
(5)    a. decrease      b. 12 units of food              c. 2 units of other goods
       d. -2            e. $10.
(6)    a. 1/5=0.2       b. 1/10=0.1      c. 1/500=0.002.
(7)    a. 150           b. $8            c. 20 permits   d. 10 permits.
(8)    a. MSB = 60000 – 5000 Q    b. 8 miles.

### III. PROBLEMS
(1)    a. 150 = 6 q$_1$ + 2 q$_2$          b. MRSC $= \dfrac{2q_1}{3q_2}$          c. q$_1$* = 15, q$_2$* = 30 .
(2)    a. own-price elasticity of demand = -0.9.

Justification: $\varepsilon = \dfrac{\partial q_{1}*}{\partial p_1}\dfrac{p_1}{q_1} = \dfrac{3(-0.9)p_1^{-1.9}p_2^{-0.2}I^{1.1}}{3p_1^{-0.9}p_2^{-0.2}I^{1.1}}\dfrac{p_1}{} = $ -0.9,

Or give the rule of thumb: "This is a power function, so the exponent of $p_1$ is the own-price elasticity of demand."

b. $3 (a p_1)^{-0.9} (a p_2)^{-0.2} (aI^{1.1}) = a^{-0.9} a^{-0.2} a^{1.1} 3 p_1^{-0.9} p_2^{-0.2} I^{1.1} = a^0 3 p_1^{-0.9} p_2^{-0.2} I^{1.1}$.
Since the $a$ factors cancel out, this function is homogeneous of degree zero in income and prices.

(3)   a. 90 units   b. $6          c. export       d. 60 units     e. decrease
      f. $160       g. increase    h. $220         i. increase     j. $60.

(4)   a. MR = 20 – (Q/10)          b. Q* = 180                     c. P* = $11
      d. profit = $1620            e. DWL = $810                   f. Q* = 360
      g. profit = $3240            h. DWL = zero under perfect price discrimination.

(5)   a. Q = 700, P = $8           b. MSC = 3 – (3Q/100)           c. Q* = 400
      d. tax = $6.

(6)   a. Q** = 6000 cars           b. Q* = 3000 cars               c. fee = $3.

(7)   a. $50 thousand              b. 200 utils                    c. $40 thousand
      d. $50 thousand              e. $40 thousand.

## IV. CRITICAL THINKING
(Same as Version A.)


[end of answer key]