



المجمع العربي للمحاسبين القانونيين  
Arab Society of Certified Accountants (ASCA)

(ACPA)

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UNIVERSITY of CAMBRIDGE  
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1- Supply = Demand

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$$29 + \frac{1}{3}Q = 120 - 4Q$$

$$4\frac{1}{3}Q = 91$$

$$\begin{aligned} \mathbf{Q} &= \mathbf{21} & = \\ \mathbf{P} &= \mathbf{36} & = \end{aligned}$$

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$$\begin{aligned} 2- P + 13 &= 120 - 4Q \\ P &= 120 - 4Q - 13 \end{aligned}$$

Then

$$120 - 4Q - 13 = 29 + \frac{1}{3}Q$$

$$4\frac{1}{3}Q = 78$$

$$\begin{aligned} Q &= 18 \\ P_d &= 48 \\ P_s &= 35 \end{aligned}$$

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So the consumer pays an additional 12. The remaining 1 of the tax is paid by the firm.

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1-  $Y = C + I + G$   
 $Y = 25 + .8(Y - 10 - .1Y) + 55 + 40$   
 $Y - 25 + 08Y - 8 - .08Y + 55 + 40$

$$.28Y = 111$$

$$Y = 400 =$$

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2-  $Y = C + I + G$   
 $400 = C + 55 + 40$

$$C = 305$$

$$T = 10 + .1Y$$

$$T = 10 + .1(400)$$

$$T = 50$$

$$S = Y - C - T$$

$$S = 400 - 305 - 50$$

$$S = 45 =$$

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3-  $\text{Surplus} = T - G =$

$$= 50 - 40$$

$$= 10$$

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1-

$$\Sigma 11 = \frac{\partial Q}{\partial P_1} \frac{P_1}{Q}$$

$$Q = 500 - 3(20) - 2(30) + .01(5000) + 430 =$$

$$\Sigma 11 = -3 \cdot \frac{20}{430} = \frac{-60}{430} = -.139$$

$$\Sigma 11 = .139$$

This commodity is **Ordinary** because  $\Sigma 11 = -.139$  and it is **inelastic**.  
 If the price increases by 1% the demand will decrease by .139.

$$\frac{\Delta Q}{\Delta P_1} = \dots \%$$

$$2- \Sigma 12 = \frac{\Delta Q}{\Delta P_2} \frac{P_2}{Q}$$

$$= -2 \cdot \frac{30}{430} = -\frac{60}{430} = -.139$$

The two goods are complement because  $\Sigma 12 < 0$ . If the price of the second good increases by 1% the demand for the first good will decrease by .139.

$$3- \Sigma 13 = \frac{\Delta Q}{\Delta Y} \frac{Y}{Q}$$

$$= +.01 \cdot \frac{5000}{430} = .116$$

The commodity is normal because  $\Sigma 13 > 0$ . If income increases by 1% the demand will increase by .116.

$$\frac{\Delta Q}{\Delta Y} = \dots \%$$

X	P (X)	E (X)	(X - E (X)) <sup>2</sup> P(X)
90	.1	9	(90 - 51) <sup>2</sup> (.1) = 152.1
70	.3	21	(70 - 51) <sup>2</sup> (.3) = 108.3
45	.4	18	(45 - 51) <sup>2</sup> (.4) = 14.4
15	.2	3	(15 - 51) <sup>2</sup> (.2) = 259.2
	1	51	Var (x) = 534

a. The mean =  $\Sigma E(x) = 51$

b. Standard deviation  $\delta x = \text{Var}(x) 543 = 23.10 =$   
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Quantity Demanded Y	Price of Milk X	XY	X <sup>2</sup>	X-X̄	(X-X̄) <sup>2</sup>	Y <sup>c</sup>	Y-YC	(Y-YC) <sup>2</sup>
240	\$.20	48	.04	-.37	.137	240.0	0	0
230	.30	69	.09	-.27	.073	216.22	13.78	189.89
200	.40	80	.16	-.17	.029	192.43	7.57	57.30
160	.50	80	.25	-.07	.005	168.65	-8.65	74.82
150	.50	75	.25	-.07	.005	168.65	-18.65	347.82
140	.60	84	.36	-.03	.001	144.87	-4.87	23.72
120	.70	84	.49	.13	.017	121.08	-1.08	1.17
110	.80	88	.64	.23	.053	97.30	12.70	161.29
90	.80	72	.64	.23	.053	97.30	-7.30	53.29
80	.90	72	.81	.33	.109	73.51	6.49	42.12

$$\Sigma Y = 1.520 \quad \Sigma X = \$5.70 \quad \Sigma XY = 752 \quad \Sigma X^2 = 3.73 \quad \Sigma (X - \bar{X})^2 = .482 \quad \Sigma (Y - Y_c)^2 = 951.4$$

$$\bar{Y} = \frac{\Sigma Y}{n} = 152 \quad \bar{X} = \frac{\Sigma X}{n} = \$ .57 \quad (\Sigma x)^2 = 32.49 \quad \sigma^2_{yx} = \frac{\Sigma (Y - Y_c)^2}{n - 2} = 118.92$$

$$a. b = \frac{n \Sigma XY - \Sigma X \Sigma Y}{n \Sigma X^2 - (\Sigma X)^2} = \frac{10(752) - (5.70)(1.520)}{10(3.73) - 32.49} = \frac{7.520 - 8.664}{37.3 - 32.49}$$

$$a. = Y - b\bar{X} = 152 - (-237.84)(.57) = 152 + 135.57 = 287.57$$

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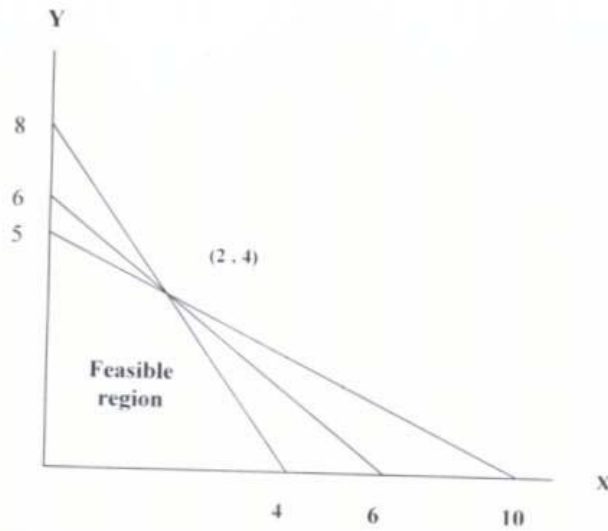
b.

Y	Y-Ȳ	(Y-Ȳ) <sup>2</sup>	Y <sub>c</sub>	Y <sub>c</sub> -Ȳ	(Y <sub>c</sub> -Ȳ) <sup>2</sup>
240	88	7.744	240.00	88.00	7.744.00
230	78	6.084	216.22	64.22	4.124.21
200	48	2.304	192.43	40.43	1.634.58
160	8	.64	168.65	16.65	.277.22
150	-2	.4	168.65	16.65	.277.22
140	-12	1.44	144.87	-7.13	.50.84
120	-32	1.024	121.08	-30.92	956.05
110	-42	1.764	97.30	-54.70	2.992.09
90	-62	3.844	97.30	-54.70	2.992.09
80	-72	5.184	73.51	-78.49	6.160.68

$$R^2 = \frac{\Sigma (Y_c - \bar{Y})^2}{\Sigma (Y - \bar{Y})^2} = \frac{27.208.98}{28,160} = .97. \text{ Approximately.}$$

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**Corner**

- (0,5)
- (2,4)
- (4,0)

**Objective**

- $2(0) + 3(5) = 15$
- $2(2) + 3(4) = 16$  Maximum of  $2X + 3Y$
- $2(4) + 3(0) = 8$

Maximum is 16, which occurs at (2,4).

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$$A_{11} = + \begin{vmatrix} 4 & 3 \\ 3 & 4 \end{vmatrix} = 7$$

$$A_{12} = - \begin{vmatrix} 1 & 3 \\ 1 & 4 \end{vmatrix} = -1$$

$$A_{13} = + \begin{vmatrix} 1 & 4 \\ 1 & 3 \end{vmatrix} = -1$$

$$A_{21} = - \begin{vmatrix} 3 & 3 \\ 3 & 4 \end{vmatrix} = -3$$

$$A_{22} = + \begin{vmatrix} 1 & 3 \\ 1 & 4 \end{vmatrix} = 1$$

$$A_{23} = - \begin{vmatrix} 1 & 3 \\ 1 & 3 \end{vmatrix} = 0$$

$$A_{31} = + \begin{vmatrix} 3 & 3 \\ 4 & 3 \end{vmatrix} = -3$$

$$A_{32} = - \begin{vmatrix} 1 & 3 \\ 1 & 3 \end{vmatrix} = 0$$

$$A_{33} = + \begin{vmatrix} 1 & 3 \\ 1 & 4 \end{vmatrix} = 1$$

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Expanding along the top row of **A** gives

$$\begin{aligned} |\mathbf{A}| &= a_{11}A_{11} + a_{12}A_{12} + a_{13}A_{13} \\ &= 1(7) + 3(-1) + 3(-1) = 1 \end{aligned}$$

using the values of  $A_{11}$ ,  $A_{12}$  and  $A_{13}$

. Other rows and columns are treated similarly. Expanding down the last column of **B** gives

$$\begin{aligned} |\mathbf{B}| &= b_{13}B_{13} + b_{23}B_{23} + b_{33}B_{33} \\ &= 0(B_{13}) + 0(B_{23}) + 0(B_{33}) = 0 \end{aligned}$$

The cofactors of **A** have already been found

. Stacking them in their natural positions gives the adjugate matrix

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$$\begin{bmatrix} 7 & -1 & -1 \\ -3 & 1 & 0 \\ -3 & 0 & 1 \end{bmatrix}$$

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Transposing gives the adjoint matrix

$$\begin{bmatrix} 7 & -3 & -3 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$$

The determinant of **A** has already been found

, so the inverse matrix is the same as the adjoint matrix.

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The determinant of **B** has already been found to be 0, so **B** is singular and does not have an inverse.

Using the inverse matrix

$$\begin{bmatrix} P_1 \\ P_2 \\ P_3 \end{bmatrix} = \begin{bmatrix} 7 & -3 & -3 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix} \begin{bmatrix} 32 \\ 37 \\ 35 \end{bmatrix} = \begin{bmatrix} 8 \\ 5 \\ 3 \end{bmatrix}$$

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:Survive

:Growth

To be big

:Make Profits

:Efficiency

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(Contingency Factors)

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