① $(x_1, y_1) = (7, 12)$ $(x_2, y_2) = (9, 7)$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{7 - 12}{9 - 7}$$

$$= -\frac{5}{2}$$

$$y = mx + b$$

$$y = -\frac{5}{2}x + b$$

Sub $x = 7$, $y = 12$ →

$$y = -\frac{5}{2}x + b$$

$$12 = -\frac{35}{2} + b$$

$$\frac{24}{2} + \frac{35}{2} = b$$

$$b = \frac{59}{2}$$

$$y = -\frac{5}{2}x + \frac{59}{2}$$

② $3x + y = 17$

$y = 17 - 3x$

$2y = 4x - 36$

$y = 2x - 18$

$y = y$

$17 - 3x = 2x - 18$

$$35 = 5x$$
$$x = 7$$

$x = 7 \rightarrow y = 17 - 3x$

$$y = -4$$

$$(x, y) = (7, -4)$$

③

	(x) Backpacks	(y) Purses	Available
Manufacture	6	5	132
Test	3	4	102
Revenue	19	71	

a) Daily Revenue $= 19x + 71y$

b) $6x + 5y \leq 132$

$3x + 4y \leq 102$

$x \geq 0$

$y \geq 0$

c)

Vertex	$19x + 7y$
$(0,0)$	0
$(0, 25.5)$	1810.5
$(22,0)$	418
$(2,24)$	1742

Maximum daily revenue = \$1810.50

(4)

$$A = \begin{bmatrix} 4 & 5 \\ 6 & 9 \end{bmatrix}$$

$$D = 4(9) - 5(6) = 6$$

$$A^{-1} = \frac{1}{6}\begin{bmatrix} 9 & -5 \\ -6 & 4 \end{bmatrix}$$

$$X = A^{-1}B$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{6}\begin{bmatrix} 9 & -5 \\ -6 & 4 \end{bmatrix}\begin{bmatrix} 24 \\ 48 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{6}\begin{bmatrix} -24 \\ 48 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -4 \\ 8 \end{bmatrix}$$

$$(x, y) = (-4, 8)$$

(5)

$$\left[\begin{array}{ccc|c} \textcircled{1} & 4 & 2 & 20 \\ 2 & 10 & 6 & 56 \\ 3 & 6 & 8 & 52 \end{array}\right]$$

$R_2 - 2R_1$, $R_3 - 3R_1$

$$\left[\begin{array}{ccc|c} 1 & 4 & 2 & 20 \\ 0 & 2 & 2 & 16 \\ 0 & -6 & 2 & -8 \end{array}\right]$$

$\frac{R_2}{2}$

$$\left[\begin{array}{ccc|c} 1 & 4 & 2 & 20 \\ 0 & \textcircled{1} & 1 & 8 \\ 0 & -6 & 2 & -8 \end{array}\right]$$

$R_1 - 4R_2$, $R_3 + 6R_2$

$$\left[\begin{array}{ccc|c} 1 & 0 & -2 & -12 \\ 0 & 1 & 1 & 8 \\ 0 & 0 & 8 & 40 \end{array}\right]$$

$\frac{R_3}{8}$

$$\left[\begin{array}{ccc|c} 1 & 0 & -2 & -12 \\ 0 & 1 & 1 & 8 \\ 0 & 0 & \textcircled{1} & 5 \end{array}\right]$$

$x \quad y \quad z$

$R_1 + 2R_3$, $R_2 - R_3$

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & -2 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 1 & 5 \end{array}\right]$$

$(x, y, z) = (-2, 3, 5)$