demand

#1 $q = mp + b$

	p	q
	$140	250
	$110	1000

slope $m = \frac{1000 - 250}{110 - 140} = \frac{750}{-30} = -25$

intercept $1000 = -25 * 110 + b$
$1000 = -2750 + b$
$b = 3750$

$q = -25p + 3750$

Supply

$q = mp + b$

	p	q
	$60	750
	$80	2250

slope $m = \frac{2250 - 750}{80 - 60} = \frac{1500}{20} = 75$

intercept $2250 = 75 * 80 + b$
$2250 = 6000 + b$
$b = -3750$

$q = 75p - 3750$

$-25p + 3750 = 75p - 3750$
$100p = 7500$
$p = \$75$

#2

$$\begin{matrix} \\ 3R_2+2R_3 \\ 3R_3-R_1 \end{matrix}\begin{bmatrix} \textcircled{3} & -2 & 8 & 9 \\ -2^{-6} & 2^{6} & 1^{3} & 3^{9} \\ 1^{3} & 2^{6} & -3^{-9} & 8^{24} \end{bmatrix}$$

$$\begin{matrix} R_1+R_2 \\ \\ R_3-4R_2 \end{matrix}\begin{bmatrix} \textcircled{3} & -2 & 8 & 9 \\ 0 & \textcircled{2} & 19 & 27 \\ 0 & 8 & -17 & 15 \end{bmatrix}$$

$$\begin{matrix} \\ \\ -1/93 * R_3 \end{matrix}\begin{bmatrix} \textcircled{3} & 0 & 27 & 36 \\ 0 & \textcircled{2} & 19 & 27 \\ 0 & 0 & -93 & -93 \end{bmatrix}$$

$$\begin{matrix} R_1-27R_3 \\ R_2-19R_3 \\ \\ \end{matrix}\begin{bmatrix} \textcircled{3} & 0 & 27 & 36 \\ 0 & \textcircled{2} & 19 & 27 \\ 0 & 0 & \textcircled{1} & 1 \end{bmatrix}$$

$$\begin{matrix} 1/3R_1 \\ 1/2R_2 \\ \\ \end{matrix}\begin{bmatrix} \textcircled{3} & 0 & 0 & 9 \\ 0 & \textcircled{2} & 0 & 8 \\ 0 & 0 & \textcircled{1} & 1 \end{bmatrix}$$

$$\begin{bmatrix} \textcircled{1} & 0 & 0 & 3 \\ 0 & \textcircled{1} & 0 & 4 \\ 0 & 0 & \textcircled{1} & 1 \end{bmatrix}$$

$x = 3$

$y = 4$

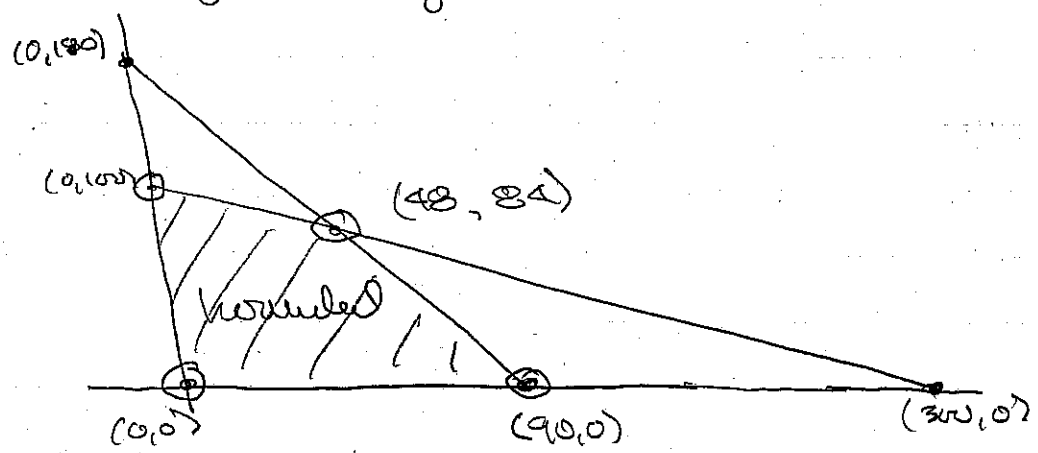
$z = 1$

#3a No solution.
Last equation is $0 = -1$

#3b Unique solution
$x = 2$
$y = 1$
$z = -1$

#3c Infinitely many solutions
z is a free variable

#4



Corners	$P = x + 1.2y$	
(0,0)	0	
(0,100)	120	
(48,84)	148.8	Maximum
(90,0)	90	

#5

$$x + y + 3z + s = 15$$
$$4x + 4y + 3z + t = 65$$
$$-3x - 3y - 4z + p = 0$$

x	y	z	s	t	p	constants	
1	1	(3)	1	0	0	15	$15/3$
4	4	3	0	1	0	65	$65/3$
-3	-3	-4	0	0	1	0	

↑

#6

$$P = 1680/3 = 560$$

$$x = 120/6 = 20$$

$$y = 240/6 = 40$$

$$z = 0$$

#7

Maximize $P = 2x + 1.50y$

subject to

$$3x + 4y \leq 1050$$
$$6x + 3y \leq 1200$$
$$x \geq 0 \quad y \geq 0$$