ch 5
#3

a) Problem in standard form

Max $5x_1 + 9x_2 + 0s_1 + 0s_2 + 0s_3$

s.t. $x_1, x_2, s_1, s_2, s_3 \geq 0$ and

$$\begin{cases} \frac{1}{2}x_1 + 1x_2 + 1s_1 = 8 \\ 1x_1 + 1x_2 - 1s_2 = 10 \\ \frac{1}{4}x_1 + \frac{3}{2}x_2 - 1s_3 = 6 \end{cases}$$

b) Each basis will correspond to 3 variables; so at least two of x_1, x_2, s_1, s_2, s_3 will be assigned values of zero.

c) If $s_1 = s_2 = 0$ then our basic solution is found by the following logic.

$$\left.\begin{array}{l} \frac{1}{2}x_1 + 1x_2 = 8 \\ 1x_1 + 1x_2 = 10 \end{array}\right\} \Rightarrow \frac{1}{2}x_1 = 2$$

$x_1 = 4$; $x_2 = 6$.

So, our corresponding basic solution is

$x_1 = 4$, $x_2 = 6$, $s_1 = 0$, $s_2 = 0$, $s_4 = 4$.

d) If $x_1 = s_3 = 0$ then $\frac{3}{2}x_2 = 6$

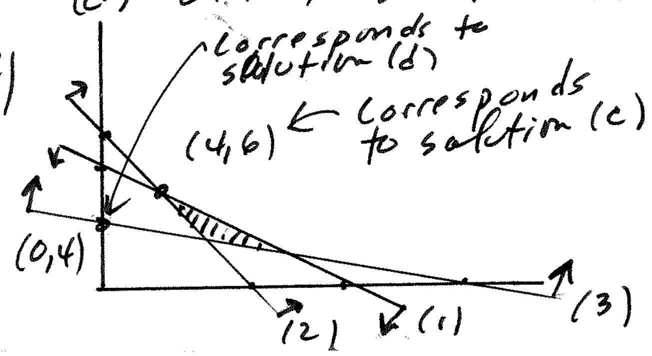
$x_2 = 4$; $s_1 = 4$; $s_2 = -6$.

So, our corresponding basic solution is

$x_1 = 0$, $x_2 = 4$, $s_1 = 4$, $s_2 = -6$, $s_3 = 0$.

e) The solution in (c) is feasible and an extreme point because all constraints are satisfied and the solution corresponds to the intersection of the constraint lines for constraints (1) and (2). The solution (d) is not feasible as s_2 is negative. So, (d) cannot be an extreme point either.

(f)



Results agree with remarks in (f)