Math 354
Quiz #3 Name: _____ netID: _____ Section: _____

1. Consider the linear programming problem with constraints $A\mathbf{x} = \mathbf{b}$ and $\mathbf{x} \geq \mathbf{0}$ where

$$A = \begin{bmatrix} 2 & 1 & 3 & 1 & 0 & 0 \\ 4 & 3 & 1 & 0 & 1 & 0 \\ -1 & 2 & 4 & 0 & 0 & 1 \end{bmatrix}, \quad \mathbf{b} = \begin{bmatrix} 6 \\ 3 \\ 8 \end{bmatrix},$$

and $\mathbf{x} = \begin{bmatrix} x_1 & x_2 & x_3 & x_4 & x_5 & x_6 \end{bmatrix}^\top$. Let $\mathbf{z} = \begin{bmatrix} \frac{3}{10} & 0 & \frac{9}{5} & 0 & 0 & \frac{11}{10} \end{bmatrix}^\top$.

(a) Verify that $\mathbf{z}$ is a feasible solution.

(b) Determine whether or not $\mathbf{z}$ is a *basic* feasible solution. Explain/justify your reasoning. If yes, what are the basic variables?

2. The following tableau came up in the process of using the simplex method to solve a linear programming problem.

	x_1	x_2	x_3	x_4	x_5	
x_4	0	4	0	1	6	15
x_1	1	2	0	0	-3	6
x_3	0	2	1	0	4	17
	0	-2	0	0	-1	14

(a) Determine the pivot row and column for this tableau (and show your justification) and complete ***one step*** of the simplex method.

(b) Answer the following questions about your new tableau.

i. What is the corresponding basic feasible solution?

ii. Is it optimal? (Why or why not?)

iii. What is the value of the objective function at this feasible solution?