NAME: (print!) _____

E-MAIL ADDRESS: (print!) _____

1. (3 points) Describe in as much detail as possible the solution(s) to the dual problem if you know that

"An optimal solution is $[1, 0, 2, 0, 3, 0, 5, 0, 0]^T$ with objective function value 1000 ."

2. (5 points) Suppose that $x_1 = 2, x_2 = 0, x_3 = 4$ is an optimal solution to the linear programming problem

Maximize $z = 4x_1 + 2x_2 + 3x_3$

subject to

$$2x_1 + 3x_2 + x_3 \leq 12$$

$$x_1 + 4x_2 + 2x_3 \leq 10$$

$$3x_1 + x_2 + x_3 \leq 10$$

$$x_1 \geq 0 \quad , \quad x_2 \geq 0 \quad , \quad x_3 \geq 0 \quad .$$

Using the principle of complementary slackness and the duality theorem, find an optimal solution to the dual problem. What value of the objective function of the dual problem have at this optimal solution?