Name:_____

MATH 1090-8: QUIZ 6

no calculators allowed!

October 25, 2007

1. (a) Sketch the graph of the system of inequalities

$$\begin{aligned} 2x + y &\leq 4 \\ x &\geq 0 \\ y &\geq 0. \end{aligned}$$

Clearly label any corners.

Solution. The solution region is a triangle with vertices $(0, 0)$, $(0, 4)$, and $(2, 0)$.

(b) Use the the graphical method to maximize $f = 5x + 2y$ with respect to the constraints listed above. (Clearly indicate your work. You may still receive full credit for (b) even if your answer to (a) is incorrect.)

Solution. Since the region in (a) is closed and bounded, f will attain a maximum at one of the corners. Plugging in the three corner values, we quickly see that f achieves a maximum of 10 and the corner $(x, y) = (2, 0)$.

(c) Suppose that instead of using the graphical method to solve the maximization problem in (b) one used the simplex method instead. Set up the initial matrix used in the simplex method. Clearly label the first pivot. (The problem only asks for the initial matrix and pivot, not the solution using the simplex method.)

Solution. The initial matrix, with first pivot underlined, is

$$\left[\begin{array}{cccc|c} \underline{2} & 1 & 1 & 0 & 4 \\ \hline -5 & -2 & 0 & 1 & 0 \end{array}\right]$$