Quiz 2 
Math 314 F01

Name: Solutions 
09/17/14

1. For a $2 \times 3$ matrix $A$ and vector $\mathbf{b} \in \mathbb{R}^2$, consider the matrix problem

$$A\mathbf{x} = \mathbf{b},$$

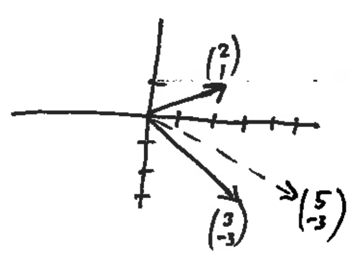
where $\mathbf{x}$ is unknown.

The *row* interpretation of this problem would be sketched as 2 (hyper)planes, in 3 -dimensional space. (Fill in numbers.)

Most typically, how many solutions will this problem have? Explain your answer in geometric terms. Infinitely many – 2 planes in 3-space are most likely to intersect in a line, and every point on the line is a solution.

2. (a) Draw a sketch illustrating the *column* interpretation of the matrix problem below. (You do not need to illustrate a solution.)

$$\begin{pmatrix} 3 & 2 \\ -3 & 1 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 5 \\ -3 \end{pmatrix}.$$




(b) In a sentence or two, explain why your sketch indicates that this problem has a solution. (Do **not** give the solution.)

Since $\binom{2}{1}$ and $\binom{3}{-3}$ have different directions, linear combinations of them will produce <u>all</u> vectors in $\mathbb{R}^2$, hence can produce the particular vector $\binom{5}{-3}$