Math 265 Summer 2018 - Quiz 01-Answer

13/6/2018 - 10 Minutes **Name:**

Remember that your work is graded on the quality of your writing and explanation as well as the validity of the mathematics.

(1) (10 Points) Write down the augmented matrix of the following system, and is $(1, 0, 1)$ is a solution of it?

$$\begin{cases} x_1 + 2x_2 + 3x_3 & = 4 \\ 2x_1 - x_2 + x_3 & = 3 \\ -x_1 + x_2 + x_3 & = 0 \end{cases}$$

Answer:

$$\begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & -1 & 1 & 3 \\ -1 & 1 & 1 & 0 \end{pmatrix}$$

Yes. To verify if $(1, 0, 1)$ is a solution of this system, we just subsititue it back to these equations:

$$1 + 2 * 0 + 3 * 1 = 4,$$

$$2 * 1 - 0 + 1 = 3,$$

$$-1 + 0 + 1 = 0.$$

Therefore, it's a solution of this system.

(2) (10 Points) Find an equation involving g, h, and k that makes this augmented matrix correspond to a consistent system:

$$\begin{pmatrix} 1 & 0 & 1 & g \\ 2 & 6 & 0 & h \\ -1 & 3 & -2 & k \end{pmatrix}$$

Answer: $4g - h + 2k = 0$.

By $R_2 - 2R_1$, we get

$$6x_2 - 2x_3 = h - 2g.$$

Similarly, by $R_1 + R_3$, we will have

$$3x_2 - x_3 = g + k.$$

Since we require it to be a consistent system, we need

$$h - 2g = 6x_2 - 2x_3 = 2 * (3x_2 - x_3) = 2 * (g + k)$$

which is $4g - h + 2k = 0$.