Ungraded Quiz + Questionnaire

Math 22: 12 Section

March 28, 2014

1. Solve the linear system

$$x + y = 1$$
$$x + 2y = 1$$

   Solution:

   Write the augmented matrix

   $$\begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 1 \end{bmatrix}.$$

   Subtract the first from the second row, transforming the matrix to echelon form

   $$\begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 0 \end{bmatrix}.$$

   There are solutions because no bad rows. Subtract the second row from the first to get

   $$\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$$

   which tells us that the solution is $x = 1, y = 0$.

2. Two systems of linear equations are *equivalent* when they have the same solution set/solutions. A system of linear equations is *consistent* when it has at least one solution.

3. **True** or false: a linear combination of vectors in $\mathbb{R}^3$ is another vector in $\mathbb{R}^3$.

4. Let $\mathbf{v} = (1, 2)$ and $\mathbf{w} = (2, 4)$ in $\mathbb{R}^2$. Write $\mathbf{v}$ as a scalar multiple of $\mathbf{w}$ and vice versa.

   If we multiply $\mathbf{v}$ by the scalar 2, we obtain

   $$2\mathbf{v} = 2(1, 2) = (2 \cdot 1, 2 \cdot 2) = (2, 4) = \mathbf{w}.$$

   If we multiply $\mathbf{w}$ by the scalar $\frac{1}{2}$ we obtain

   $$\frac{1}{2}\mathbf{w} = \frac{1}{2}(2, 4) = (\frac{1}{2} \cdot 2, \frac{1}{2} \cdot 4) = (1, 2) = \mathbf{v}.$$