Name:

Math 1553 J1-J4 Quiz : Lines and Planes Solutions

The quiz has a total of 12 points and you have 10 minutes. Read carefully.

- **1.** [1 point each] Which of the following are linear equations in *x*, *y*,*z*?
 - (1) x = 0
 - (2) $x\underline{y} = \sqrt{\pi}$
 - $(3) \quad \sqrt{2}x + z = 4$

Solution.

- (1) Yes.
- (2) No. The variables cannot multiply each other
- (3) Yes. The square root is only a coefficient of x
- **2.** [3 points each] For each of the following systems, provide a solution (if it exists) and determine whether this solution is unique.
 - (1) 2x + y = 7x - y = 2 (2) 2x + 2y = 63x + 3y = 9

Solution.

- (1) Intersection at (3, 1), solution is unique.
- (2) Intersection at, e.g., (1,2), solution is not unique. (Because, e.g., the point (2,1) also satisfies both equations; or because both equations represent the same line)

2 points for giving a valid intersection and 1 point for stating weather the solution is unique or not.

Turn the page!

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3. [3 points] Translate the following system of equations into an (augmented) matrix. Is this in echelon form? Justify your answer

Solution.

The augmented matrix is

$$\begin{pmatrix} 1 & 1 & 0 & 1 & | & 7 \\ 0 & 3 & 1 & 0 & | & -2 \\ 0 & 0 & -1 & 3 & | & 4 \\ 0 & -1 & 2 & 0 & | & 0 \end{pmatrix}$$

It is not in echelon form because there is a pivot in the second column but the second entry of the last row there is not zero.

One point for each of the following:

- writing down the matrix,
- stating it is not in echelon form
- explaining their reasoning

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