Math 245 - Practice Quiz # 2

Directions: Show **ALL** of your work. Answers that are not supported by calculations, graphs/diagrams, and explanations will **not** be given full credit.

1. (4 total points - 1 point each) Please circle either T (true) or F (false) for each of the below statements. There is no penalty for guessing. You DO NOT have to show your work to receive full credit.

   I) T F The equation $3x + 4y - 5z + xy = 5$ describes a plane in $\mathbb{R}^3$.

   II) T F A normal vector to the plane $2x - y + 2z = 0$ is the vector (2, 1, 2).

   III) T F If $\mathbf{u} \in \mathbb{R}^3$, then $\mathbf{u} \times \mathbf{u} = \mathbf{u}$.

   IV) T F The line $x = t$, $y = -t$, $z = 1$ intersects the plane $x + y + z = 0$.

2. (3 points) If $\mathbf{u} = \hat{\mathbf{i}} - 2\hat{\mathbf{j}} + \hat{\mathbf{k}}$ and $\mathbf{v} = 2\hat{\mathbf{i}} + \hat{\mathbf{j}} + \hat{\mathbf{k}}$, find $\mathbf{u} \times \mathbf{v}$.

3. (3 total points) Find the parametric and symmetric equations of the line passing through $(-1, 2, -5)$ and in the direction of $\mathbf{u} = (3, 3, 7)$.

4. (4 points) Find the point of intersection between the line $x = -1+t$, $y = 2-2t$, $3-4t$ and the plane $3x - y + z = 5$.

5. (6 points) Find the equation of the plane passing through (1,1,1) and perpendicular to the line of intersection between $2x - y + z = 1$ and $x + y - z = 3$.