## Math 173 - Quiz 3

February 4, 2016

Name Key Score

Show all work to receive full credit. Supply explanations when necessary.

1. (4 points) Find a unit vector orthogonal to both  $\vec{u} = -3\hat{\imath} + 8\hat{\jmath} + \hat{k}$  and  $\vec{w} = 5\hat{\imath} - 2\hat{\jmath} - 2\hat{k}$ .

$$\vec{u} \times \vec{\omega} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ -3 & 8 & 1 \\ 5 & -3 & -3 \end{vmatrix} = \hat{i} (-16+3) - \hat{j} (6-5) + \hat{k} (6-40)$$

$$= -14\hat{i} - \hat{j} - 34\hat{k}$$

$$|| \vec{u} \times \vec{\omega} || = \sqrt{(-14)^2 + (-1)^2 + (-34)^2} = \sqrt{1353}$$

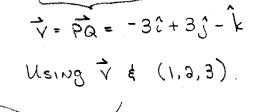
1353 (142+3+34k)

2. (2 points) Find the area of the parallelogram determined by the vectors in Problem #1.

AREA = 
$$\|\vec{u} \times \vec{\omega}\| = \sqrt{1353} \times 36.78$$

3. (2 points) Find symmetric equations for the line through (1, 2, 3) and (-2, 5, 2).

$$\frac{x-1}{-3} = \frac{y-3}{3} = \frac{z-3}{-1}$$



4. (2 points) Find a unit vector parallel to the line with parametric equations:

$$x = 4 - t, \quad y = 4t, \quad z = 6 + 2t.$$

$$\overrightarrow{\nabla} = - \overrightarrow{C} + \overrightarrow{4} \overrightarrow{0} + \overrightarrow{0} \overrightarrow{k}$$

$$||\overrightarrow{\nabla}|| = \sqrt{(-1)^2 + (\cancel{4})^2 + (\cancel{3})^2} = \sqrt{3}|$$

$$\frac{1}{||\vec{v}||} = \frac{1}{||\vec{v}||} \left( -\hat{c} + 4\hat{J} + 3\hat{k} \right)$$