

Name: _____

Directions: Show all work. No credit for answers without work.

1. **[2.5 points]** Find the point at which the line $x = 3 - t$, $y = 2 + t$, $z = 5 + t$ intersects the plane $x - y + 2z = 9$, or show there is no point of intersection.

2. **[2.5 points]** Find an equation for the plane containing points $(1, 1, 1)$, $(2, -1, 3)$, and $(5, -3, -2)$.

3. [2.5 points] Find the unit tangent vector $\vec{T}(t)$ to the curve $\vec{r}(t) = (\cos t)\vec{i} + (3t)\vec{j} + (2 \sin(2t))\vec{k}$ at the point $t = 0$.

4. [2.5 points] Find the curvature $\kappa(t)$ of $\vec{r}(t) = t^2\vec{i} + t\vec{k}$.