Quiz 1 25 points Math 200 Name: _____

1. (6 points) Find the equation of the plane in standard form that contains the point $P = (1, 1, -2)$ and contains the line with position function $\vec{p}(t) = \langle t, 1 + t, 2t \rangle$.

2. Let $\vec{u} = \hat{\imath} - 2\hat{\jmath} + 3\hat{k}$ and $\vec{p} =< 2, -2, 1 >$. You may use work from one part in other parts.

   (a) (4 points) Find the area of the triangle spanned by $\vec{p}$ and $\vec{u}$.

   (b) (2 points) Find the flux of the constant vector field $\vec{F} =< 1, 1, 1 >$ through the parallelogram spanned by $\vec{u}$ and $\vec{p}$ and oriented from $\vec{u}$ to $\vec{p}$.

   (c) (1 point) Find the volume of the box spanned by $\vec{F}$, $\vec{p}$, and $\vec{u}$.

3. Let $\vec{v} = 2\hat{\imath} + \hat{\jmath} + 2\hat{k}$ and $\vec{w} =< 1, -1, 2 >$. You may use work from one part in other parts.

(a) (3 points) Find the cosine of the angle between $\vec{v}$ and $\vec{w}$.

(b) (4 points) Find $\vec{w}_{\parallel\vec{v}}$ and $\vec{w}_{\perp\vec{v}}$.

(c) (1 point) Find the work done by a force $\vec{w}$ applied to a particle with displacement $\vec{v}$.

(d) (4 points) Find a position function **or** the coordinate equations of a line that passes through the point $(2, 3, -1)$ that is parallel to $\vec{v}$.