Name: ____________________________

Worksheet #6 - Lines and Planes

In this worksheet, you will use work with equations of lines and planes in three-dimensional space.

1. Find an equation for a plane through the point \((1, 3, -1)\) that is perpendicular to the vector \(\langle 2, -1, -3 \rangle\).

2. Find an equation for the plane that contains the following three points: \(A(1, 0, 1), B(2, 1, 1)\) and \(C(-2, 4, 0)\).
Find the point where the line given by
\[ \vec{r}(t) = \langle 2 + t, 3 - 4t, 7t \rangle \]
intersects the plane
\[ x + y - z = 4. \]

Determine whether the lines given by the vector equations
\[ \vec{r}_1(t) = \langle 2 + t, 3 - t, 4t \rangle \]
and
\[ \vec{r}_2(s) = \langle 3 - s, 3 + 2s, 3 - 5s \rangle \]
intersect; if so, what are the coordinates of the intersection?
5 Find a vector equation for the line of intersection of the planes

\[ 2x + y + 3x = 4 \]

and

\[ -x + 3y + z = 5. \]

6 Find an equation for a plane that contains both of the following lines:

\[ \vec{r}_1(t) = \langle 2t, 3 - 3t, 4 + t \rangle \]

and

\[ \vec{r}_2(t) = \langle 2 + 3t, 2 + t, 5 - 3t \rangle. \]