1.55(a)

1  1.55(a), §1 Asked

Given: The point \( P \) with \( \vec{r}_P = (1, 2, -3) \) and the vector \( \vec{N} = 3\hat{i} - 4\hat{j} + 5\hat{k} \).

Asked: The equation for the plane through \( P \) and normal to \( \vec{N} \).

2  1.55(a), §2 Solution

\[ \vec{r}_P = (1, 2, -3) \quad \vec{N} = 3\hat{i} - 4\hat{j} + 5\hat{k} \]

In general
\[ \vec{r} \cdot \vec{N} = \vec{r}_P \cdot \vec{N} \]
where \( \vec{r} = (x, y, z) = x\hat{i} + y\hat{j} + z\hat{k} \).

Plug in the numbers and dot out:
\[ 3x - 4y + 5z = 1 \cdot 3 - 2 \cdot 4 - 3 \cdot 5 = -20 \]