

# 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:

$$3x - 4y + 5z = 1 \cdot 3 - 2 \cdot 4 - 3 \cdot 5 = -20$$