## 2.2.16

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## Question

The angle between the planes

$$\mathbf{r} \cdot (2\hat{i} - 3\hat{j} + \hat{k}) = 1$$
 and  $\mathbf{r} \cdot (\hat{i} - \hat{j}) = 4$ 

## Solution

## **Solution:**

Let  $P_1$  and  $P_2$  are the planes given respectively.

The normal vector of the planes, say  $n_1$  and  $n_2$  are:

$$\mathbf{n_1} = \begin{pmatrix} 2 \\ -3 \\ 1 \end{pmatrix} \tag{1}$$

$$\mathbf{n_1} = \begin{pmatrix} 1 \\ -1 \\ 0 \end{pmatrix} \tag{2}$$

Thus, the cosine of the angle between the two is

$$\cos\theta = \frac{\mathbf{n_1} \cdot \mathbf{n_1}}{|n_1||n_2|} \tag{3}$$

$$=\frac{5}{\sqrt{14}\times\sqrt{2}}=\frac{5}{\sqrt{28}}\tag{4}$$

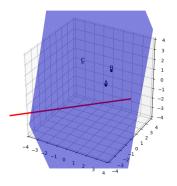


Figure: \*