True/False:

The angle between the planes $\vec{r}\cdot(2\hat{i}-3\hat{j}+\hat{k})=1$ and $\vec{r}\cdot(\hat{i}-\hat{j})=4$ is $\cos^{-1}\frac{-5}{\sqrt{58}}$.

Sol. False

Normal to the plane $\vec{r}\cdot(2\hat{i}-3\hat{j}+\hat{k})=1$ is $\vec{n}_1=2\hat{i}-3\hat{j}+\hat{k}$

Normal to the plane $\vec{r}\cdot(\hat{i}-\hat{j})=4$ is $\vec{n}_2=\hat{i}-\hat{j}$

$\therefore$ Angle between the planes is given by $\cos\theta=\frac{\vec{n}_1\cdot\vec{n}_2}{|\vec{n}_1||\vec{n}_2|}$

$$\Rightarrow \quad \cos\theta=\frac{|(2\hat{i}-3\hat{j}+\hat{k})\cdot(\hat{i}-\hat{j})|}{\sqrt{4+9+1}\sqrt{1+1}}$$

$$\Rightarrow \quad \cos\theta=\frac{|2+3|}{\sqrt{14}\sqrt{2}}=\frac{5}{2\sqrt{7}}$$

$$\therefore \quad \theta=\cos^{-1}\left(\frac{5}{2\sqrt{7}}\right)$$