

Problem 1. (10 pts) Find the angle between the vectors $\vec{u} = 2\vec{i} - 2\vec{j} + \vec{k}$ and $\vec{v} = 3\vec{i} + 4\vec{k}$

A. $\arccos(2/3)$

B. $\pi/3$

C. $\arccos(2/15)$

D. $2\pi/3$

E. None of the above

$$\cos \theta = \frac{\vec{u} \cdot \vec{v}}{|\vec{u}| \cdot |\vec{v}|} = \frac{6+4}{3 \cdot 5} = \frac{10}{15} = \frac{2}{3}$$

Problem 2. (10 pts) Find the equation of the plane containing the lines $L_1 : x = t + 1, y = 2t - 1, z = 3t$ and $L_2 : x = -s + 3, y = s, z = 2s + 1$.

A. $(x - 2) - 5(y - 1) + 3(z - 3) = 0$

B. $-(x - 3) + 5y + 3(z - 1) = 0$

C. $-x + 5y + 3z = 1$

D. $x + 2y + 3z = 0$

E. None of the above

$$\text{Set } \begin{cases} t+1 = -s+3 & (1) \\ 2t-1 = s & (2) \\ 3t = 2s+1 & (3) \end{cases}$$

$$\begin{aligned} (2) \text{ in } (1): t+1 &= -2t+1+3 \\ &\Rightarrow 3t=3 \Rightarrow t=1 \\ &\Rightarrow s=1 \end{aligned}$$

So L_1 & L_2 INTERSECT @ $(2, 1, 3)$

$$\vec{n} = \langle 1, -5, 3 \rangle$$

$$\langle 1, 2, 3 \rangle$$

$$\times \langle -1, 1, 2 \rangle$$