

e-01-05-013, S

$$\vec{A} = (3, 4) \quad \vec{B} = (6, -8) \quad \vec{C} = (3, 3, 3) \quad \vec{D} = (2, 1, 3) \quad \text{--- (14)}$$

$$\theta = ? \quad \vec{A} \cdot \vec{B} = ? \quad (1c)$$

$$\vec{A} \cdot \vec{B} = A_x B_x + A_y B_y \quad \rightarrow B_z$$

$$= 3 \cdot 6 + 4(-8) = 18 - 32 = -14$$

$$\vec{A} \cdot \vec{B} = |\vec{A}| |\vec{B}| \cos \theta$$

$$|\vec{A}| = \sqrt{3^2 + 4^2} = 5 \quad |\vec{B}| = \sqrt{6^2 + 8^2} = 10$$

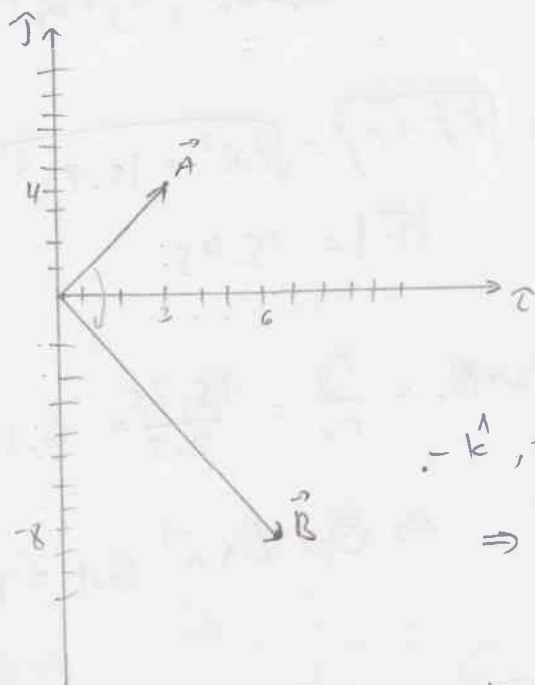
$$\Rightarrow \cos \theta = \frac{-14}{50} = -0.28$$

$$\Rightarrow \theta = 106.26^\circ$$

$|\vec{A}| =$

$\vec{A} \times \vec{B}$  (2)

$$|\vec{A} \times \vec{B}| = |\vec{A}| |\vec{B}| \sin \theta = 5 \cdot 10 \cdot \sin 106.26 = 48$$



$-k, \text{ (3) } \gamma \text{ (1) } \otimes \text{ (1) } \Rightarrow$

$$\Rightarrow \vec{A} \times \vec{B} = -48 \hat{k}$$

$$|\vec{C} \times \vec{D}| = ? \quad (2)$$

$$|\vec{C}| = \sqrt{3^2 + 3^2 + 3^2} = \sqrt{27}$$

$$|\vec{D}| = \sqrt{2^2 + 1^2 + 3^2} = \sqrt{14}$$

$$\vec{C} \cdot \vec{D} = |\vec{C}| |\vec{D}| \cos \alpha = C_x D_x + C_y D_y + C_z D_z$$

$$\Rightarrow \cos \alpha = \frac{6+3+9}{\sqrt{378}} = 0.925 \Rightarrow \alpha = 22.2^\circ$$

$$|\vec{C} \times \vec{D}| = \sqrt{378} \sin 22.2^\circ = 7.35$$