ESERCIZI D'ESAME

CINEMATICA

ESERCIZIO 3

1) $|\vec{a}| = 2$ $\quad |\vec{b}| = \sqrt{3}$ $\quad \theta = \frac{\pi}{6}$ rad $\quad |\vec{c}| = ?$

$\vec{c} = \vec{a} + \vec{b}$

$$|\vec{c}|^2 = \vec{c}\cdot\vec{c} = (\vec{a}+\vec{b})(\vec{a}+\vec{b}) = |\vec{a}|^2 + |\vec{b}|^2 + 2\,\vec{a}\cdot\vec{b} =$$

$$= |\vec{a}|^2 + |\vec{b}|^2 + 2|\vec{a}||\vec{b}|\cos\theta = 4 + 3 + 2\cdot\cancel{2}\cdot\sqrt{3}\cdot\frac{\sqrt{3}}{\cancel{2}} =$$

$$= 13 \Rightarrow \boxed{|\vec{c}| = \sqrt{13}}$$

2) TROVARE $\sin\varphi$ ESSENDO φ COMPRESO TRA $\vec{a}$ E $\vec{c}$

$$\vec{a}\cdot\vec{c} = |\vec{a}||\vec{c}|\cos\varphi = \vec{a}\cdot(\vec{a}+\vec{b}) = |\vec{a}|^2 + |\vec{a}||\vec{b}|\cos\theta$$

QUINDI

$$2\cdot\sqrt{13}\cos\varphi = 4 + \cancel{2}\cdot\sqrt{3}\,\frac{\sqrt{3}}{\cancel{2}} = 7$$

$$\cos\varphi = \frac{7}{2\sqrt{13}} \qquad \varphi = \arccos\frac{7}{2\sqrt{13}}$$

SI DEVE CALCOLARE

$\sin\varphi$ $\quad$ SI NOTI CHE $\quad \sin\varphi^2 + \cos\varphi^2 = 1$

$$\sin\varphi = \pm\sqrt{1-\cos^2\varphi} = \pm\sqrt{1-\frac{49}{4\cdot 13}} = +\sqrt{\frac{3}{52}}$$

PER QUESTIONI GEOMETRICHE

$$\boxed{\sin\varphi = \sqrt{\frac{3}{52}}}$$