Note 289(7): Basic Definition of Dot Product

This is given in "Vector Analysis Problem Solver" p. 80. With reference to Fig. (1):

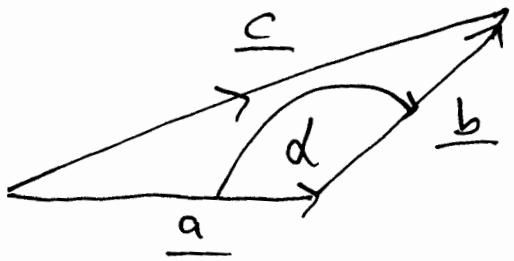

Fig (1)

then:

$$\boxed{\underline{a} \cdot \underline{b} = ab\cos(\pi - \alpha)} \quad -(1)$$

and

$$c^2 = a^2 + b^2 - 2ab\cos\alpha \quad -(2)$$

In defining the dot product the smallest angle between $\underline{a}$ and $\underline{b}$ is to be used.

This definition was used in note 289(6) as in Fig (2):

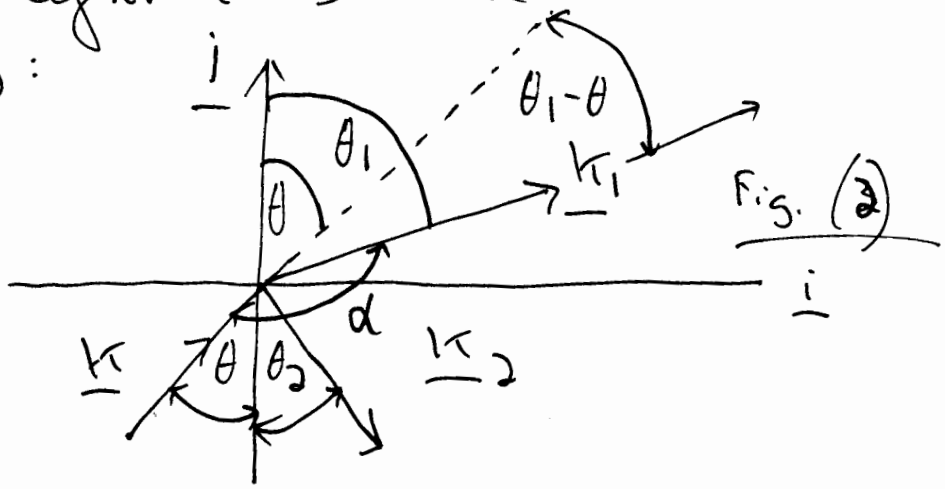

Fig. (2)

From Fig (2):

$$\pi - \alpha = \theta_1 - \theta \quad -(3)$$

so

$$\underline{\kappa} \cdot \underline{\kappa}_1 = \kappa\kappa_1\cos(\theta_1 - \theta) \quad -(4)$$