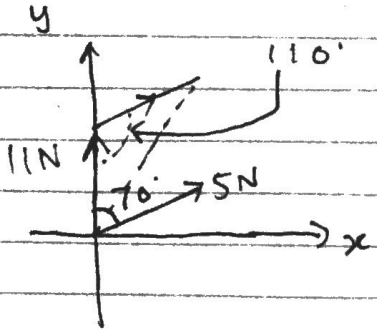
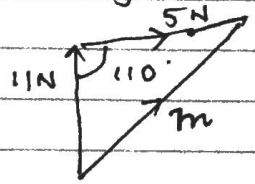
2 very simple examples .....

Ex.1



Two forces, 11 N and 5 N, act at the origin. What is the resultant vector?

Sol^n: Using cosine rule,



$m^2 = 11^2 + 5^2 - 2(11)(5)\cos 110°$

$m = 13.55\ N.$

Ex.2 Show that the force vector $\vec{D} = (2\hat{i} - 4\hat{j} + \hat{k})$ N is ORTHOGONAL to the force vector

$\vec{G} = (3\hat{i} + 4\hat{j} + 10\hat{k})$ N.

Sol^n: $\vec{D} \cdot \vec{G}$ should then be 0

$$\vec{D} \cdot \vec{G} = \begin{bmatrix} 2 \\ -4 \\ 1 \end{bmatrix} \cdot \begin{bmatrix} 3 \\ 4 \\ 10 \end{bmatrix} = 2(3) + (-4)(4) + 1(10)$$

$$= 6 - 16 + 10$$

$$= 0.$$

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