

1.

$$\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma = 1$$

$$\cos^2 \beta = 1 - \cos^2 \alpha - \cos^2 \gamma$$

$$\cos \beta = \sqrt{1 - \cos^2 \alpha - \cos^2 \gamma}$$

$$\cos \beta = \pm 0.707, \quad \beta = 45^\circ, 135^\circ$$

$$\vec{F} = F \cos \alpha \vec{i} + F \cos \beta \vec{j} + F \cos \gamma \vec{k}$$

$$= 500 \cdot (\cos 120^\circ + \cos 45^\circ + \cos 60^\circ)$$

$$= -250 \vec{i} + 354 \vec{j} + 250 \vec{k} \quad \#$$

2.

$$u_{EB} = \frac{(0-4)\vec{i} + (2-5)\vec{j} + [0-(2)]\vec{k}}{\sqrt{(0-4)^2 + (2-5)^2 + [0-(2)]^2}}$$

$$= 0.7428 \vec{i} - 0.557 \vec{j} + 0.3714 \vec{k}$$

$$u_{ED} = -\vec{j}$$

$$\vec{F} = r u_{EB} = 600(-0.7428 \vec{i} - 0.557 \vec{j} + 0.3714 \vec{k})$$

$$= -445.66 \vec{i} - 334.25 \vec{j} + 222.83 \vec{k}$$

$$\vec{F}_{ED} = \vec{F} \cdot u_{ED} = (-445.66 \vec{i} - 334.25 \vec{j} + 222.83 \vec{k}) \cdot (-\vec{j})$$

$$= 334.25 \text{ (N)} \quad \#$$

$$F_{EB} = \sqrt{(600)^2 - (334.25)^2} = 498 \text{ (N)} \quad \#$$