$$\vec{A} = \vec{A_x} + \vec{A_y} + \vec{A_z}$$

$$\cos\alpha = \frac{A_x}{A}$$

$$\cos\beta = \frac{A_y}{A}$$

$$\cos\gamma = \frac{A_z}{A}$$

6. $\vec{AB} = \langle 2, 3, -6 \rangle$

$$= \underline{2\hat{i} + 3\hat{j} - 6\hat{k}}$$

$$\vec{u}_{AB} = \frac{\langle 2, 3, -6 \rangle}{\sqrt{2^2 + 3^2 + (-6)^2}} = \frac{2}{7}\hat{i} + \frac{3}{7}\hat{j} - \frac{6}{7}\hat{k}$$

$$\vec{F_{AB}} = F_{AB} \cdot \vec{u}_{AB}$$

$$= 700 \cdot \langle \frac{2}{7}, \frac{3}{7}, \frac{-6}{7} \rangle$$

$$= 200\hat{i} + 300\hat{j} - 600\hat{k}$$

$$\vec{AC} = -1.5\hat{i} + 2\hat{j} - 6\hat{k}$$

$$U_{AC} = -\frac{3}{13}\hat{i} + \frac{4}{13}\hat{j} - \frac{12}{13}\hat{k}$$

$$\vec{F_{AC}} = F_{AC} \cdot U_{AC}$$

$$= \frac{-3F_{AC}}{13}\hat{i} + \frac{4F_{AC}}{13}\hat{j} - \frac{12F_{AC}}{13}\hat{k}$$

$$\vec{AD} = -3\hat{i} - 6\hat{j} - 6\hat{k}$$

$$U_{AD} = -\frac{1}{3}\hat{i} - \frac{2}{3}\hat{j} - \frac{2}{3}\hat{k}$$

$$\vec{F}_{AD} = F_{AD} \cdot U_{AD}$$

$$= -\frac{F_{AD}}{3}\hat{i} - \frac{2F_{AD}}{3}\hat{j} - \frac{2F_{AC}}{3}\hat{k}$$

$$\vec{F} = F\hat{k}$$

$$\sum F_x = 0$$

$$\sum F_y = 0$$

$$\sum F_z = 0$$

$$200 - \frac{3F_{AC}}{13} - \frac{F_{AD}}{3} = 0 \quad \text{--- (I)}$$

$$300 + \frac{4F_{AC}}{13} - \frac{2F_{AD}}{13} = 0 \quad \text{--- (II)}$$

$$2(I) - (II)$$

$$100 - \frac{10F_{AC}}{13} = 0$$

$$1300 = 10F_{AC}$$

$$F_{AC} = 130\,N$$

$$200 - \frac{3 \times \cancel{130}^{1}}{\cancel{13}} - \frac{F_{AD}}{3} = 0$$

$$170 = \frac{F_{AD}}{3}$$

$$F_{AD} = 510\,N$$

$$-600 - \frac{\cancel{130}^{10} \times 12}{\cancel{13}} - \frac{510 \times 2}{3} = -F$$

$$-600 - 120 - 340 = \underline{1060\,N}$$