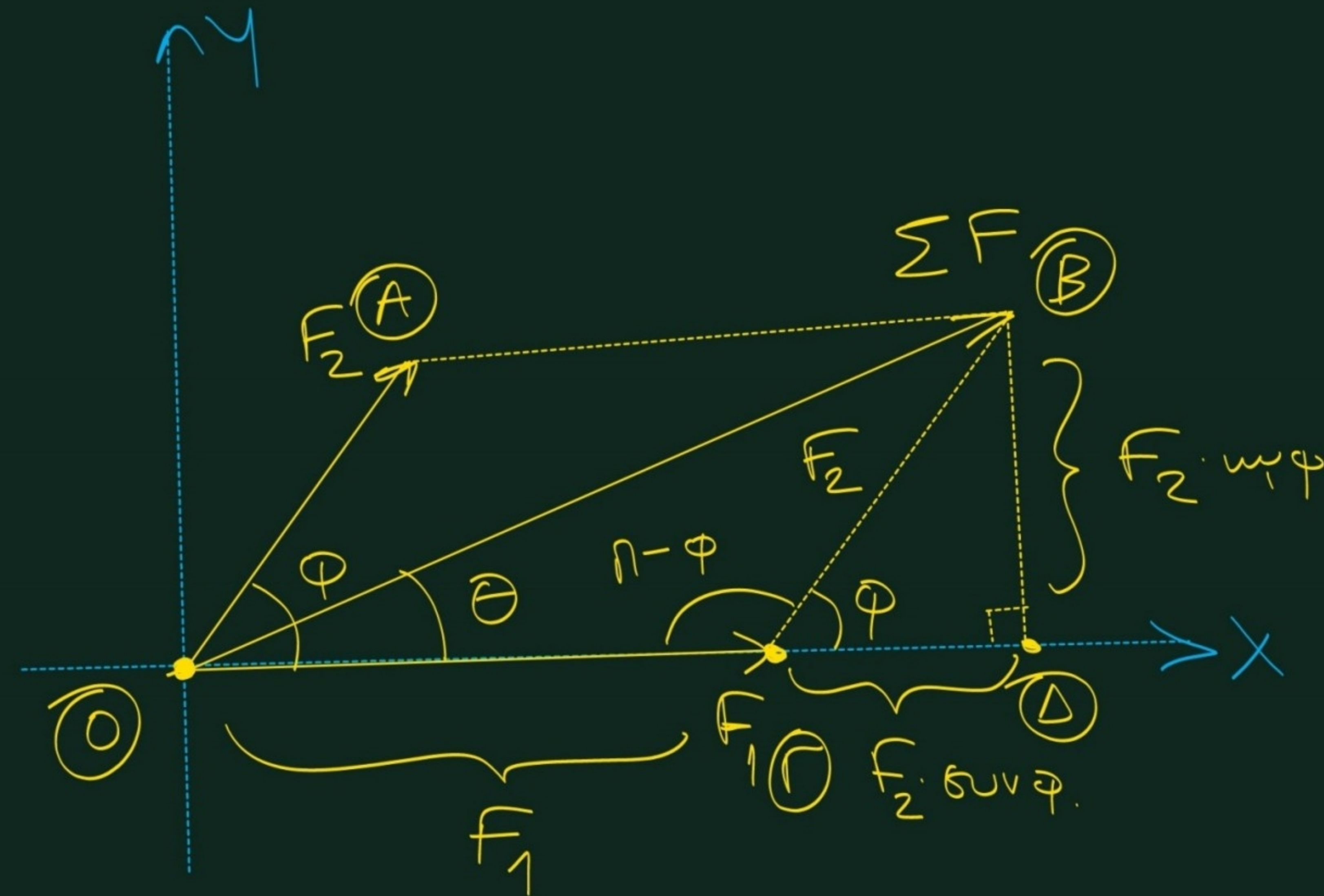








Σύνθεση δυνάμεων που σχηματίζουν  
τωχά γωνία (κανόνας παραλληλογράμμου).



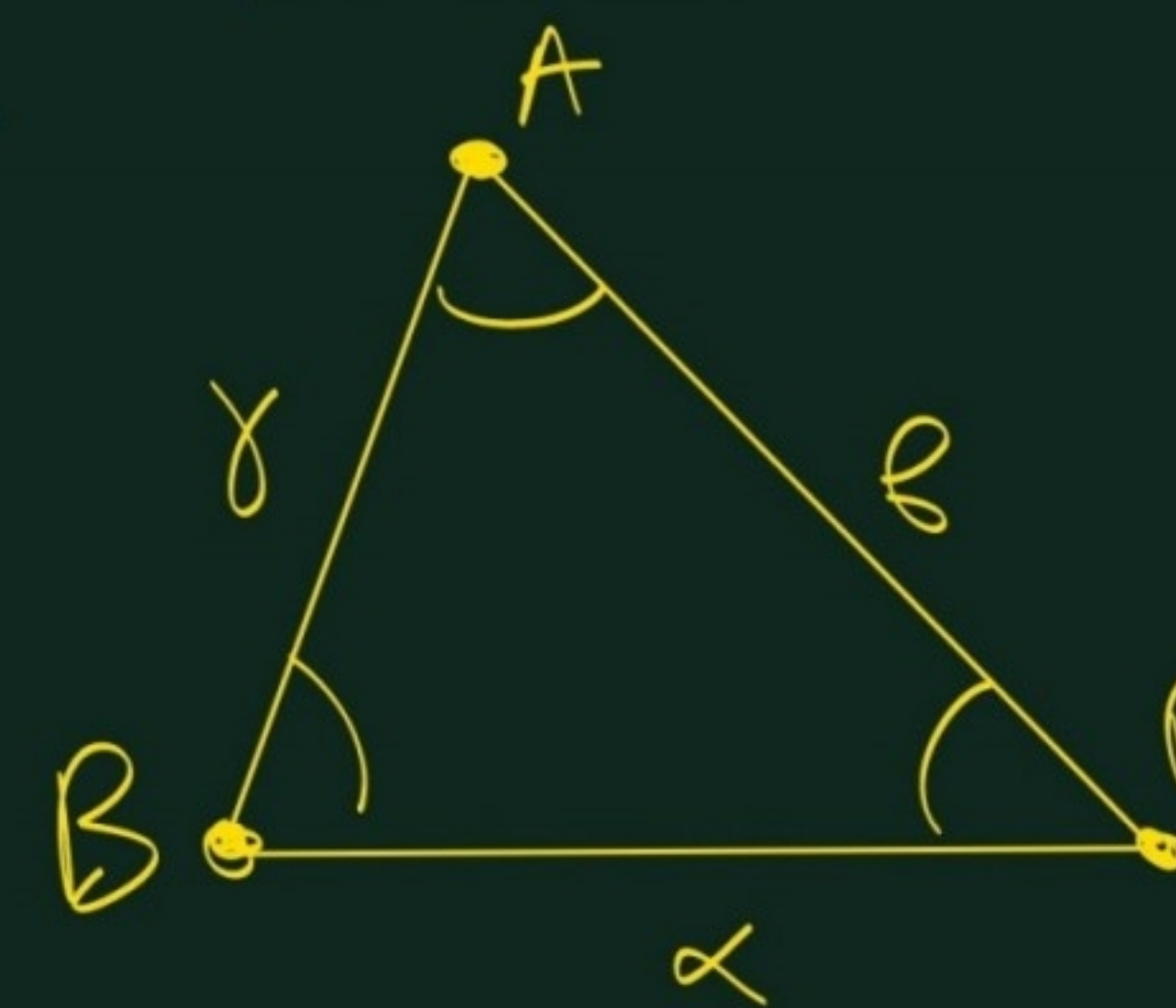
Από το νόμο των συνημιτόνων στο  $\triangle O\hat{B}\Gamma$   
έχουμε:

$$OB^2 = OG^2 + GB^2 - 2OG \cdot GB \cdot \cos(\pi - \varphi) \Rightarrow$$

$$\Sigma F^2 = F_1^2 + F_2^2 - 2F_1 \cdot F_2 \cdot (-\cos \varphi) \Rightarrow$$

$$\Sigma F^2 = F_1^2 + F_2^2 + 2F_1 \cdot F_2 \cdot \cos \varphi \Rightarrow$$

$$\Sigma F = \sqrt{F_1^2 + F_2^2 + 2F_1 \cdot F_2 \cdot \cos \varphi}$$



$$\alpha^2 = \beta^2 + \gamma^2 - 2\beta\gamma \cdot \cos A$$

$$\beta^2 = \alpha^2 + \gamma^2 - 2\alpha \cdot \gamma \cdot \cos B$$

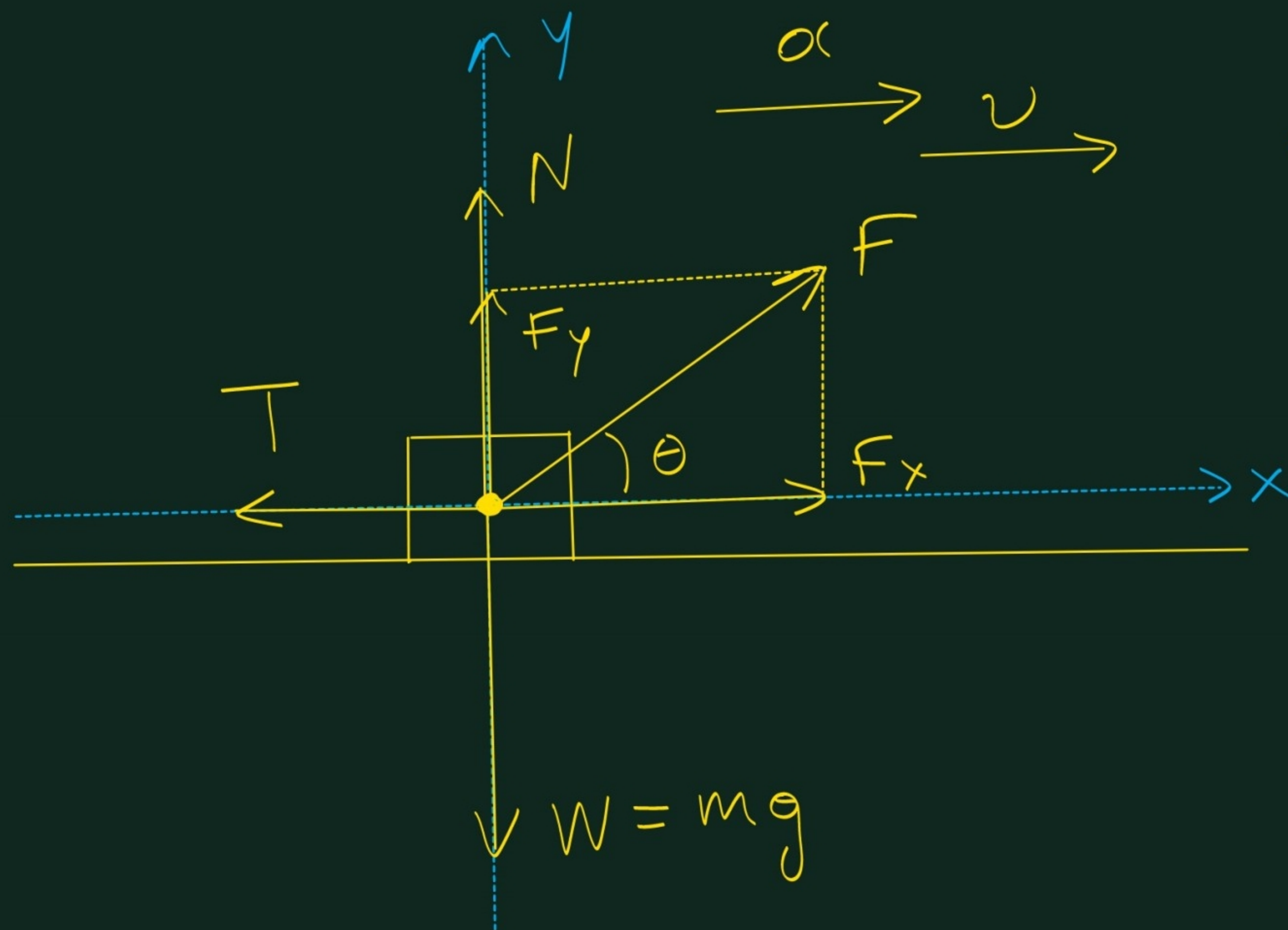
$$\gamma^2 = \alpha^2 + \beta^2 - 2\alpha \cdot \beta \cdot \cos \Gamma$$

Νόμος συνημιτόνων





Παράδειγμα 6ε2. 128-129.



$$W = mg = 10 \cdot 10 = 100 \text{ N.}$$

$$m = 10 \text{ kg}$$

$$F = 80 \text{ N}$$

$$\theta = 30^\circ$$

$$\gamma = 0,25$$

$$d) T = ;$$

$$T = \gamma \cdot N$$

$$\sin \theta = \frac{F_y}{F} \Rightarrow \sin 30^\circ = \frac{F_y}{80} \Rightarrow$$

$$\frac{1}{2} = \frac{F_y}{80} \Rightarrow F_y = 40 \text{ N.}$$

$$\cos \theta = \frac{F_x}{F} \Rightarrow \cos 30^\circ = \frac{F_x}{80} \Rightarrow$$

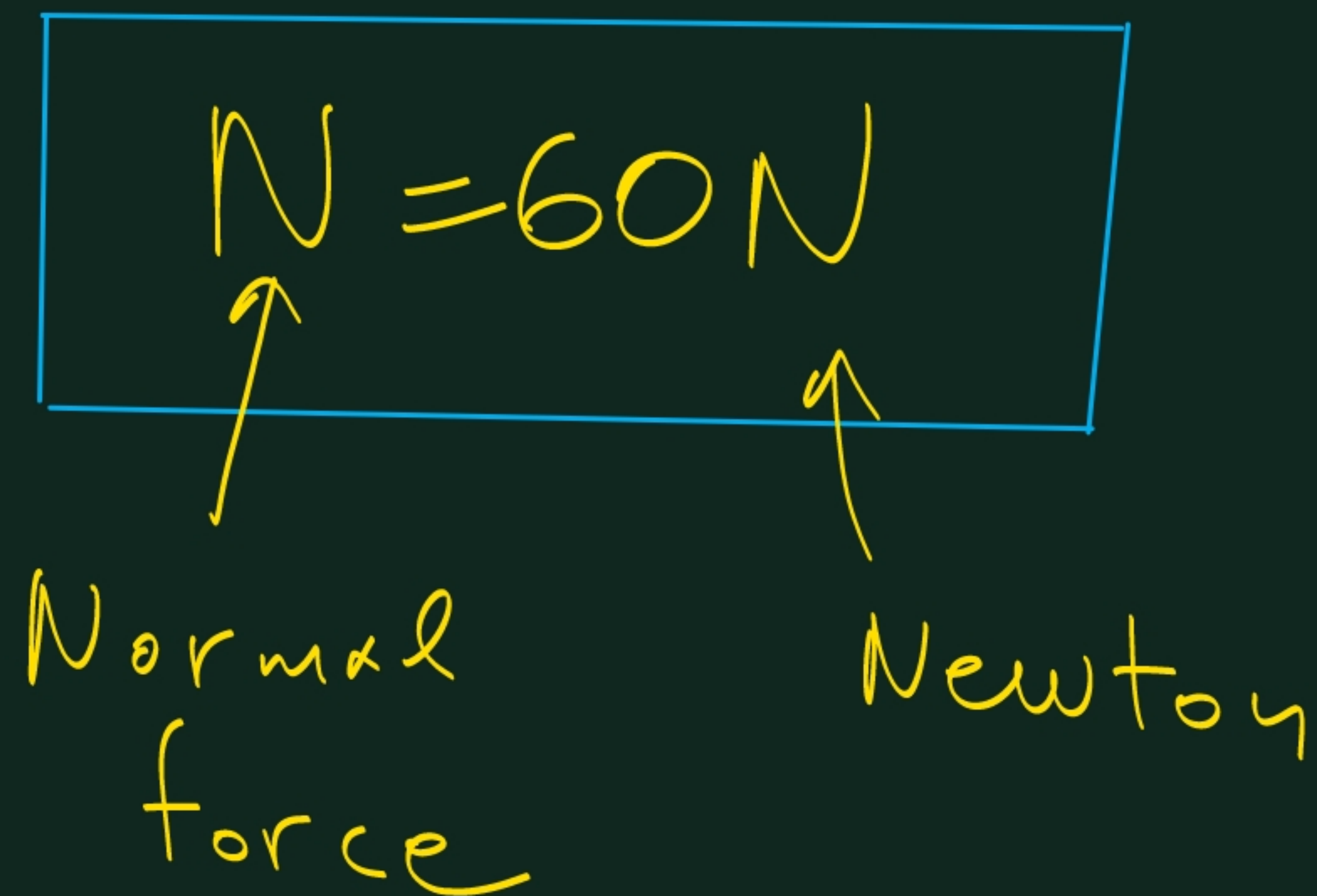
$$\frac{\sqrt{3}}{2} = \frac{F_x}{80} \Rightarrow \frac{2 \cdot F_x}{2} = \frac{80 \cdot \sqrt{3}}{2} \Rightarrow$$

$$F_x = 40\sqrt{3} \simeq 40 \cdot 1,7 = 68 \text{ N}$$

$$\sqrt{3} \simeq 1,7$$

$$\Sigma F_y = 0 \Rightarrow F_y + N - W = 0 \Rightarrow$$

$$40 + N - 100 = 0 \Rightarrow N = 100 - 40 \Rightarrow$$



$$T = \gamma N = 0,25 \cdot 60 \Rightarrow$$

$$T = 15 N$$

$$b) \Sigma F_x = m \cdot a \Rightarrow F_x - T = m \cdot a \Rightarrow$$

$$68 - 15 = 10 \cdot a \Rightarrow$$

$$53 = 10 \cdot a \Rightarrow \boxed{a = 5,3 \text{ m/s}^2}$$

$$c) S = \frac{1}{2} a \cdot t^2 \Rightarrow S = \frac{1}{2} \cdot 5,3 \cdot 4^2 = \frac{1}{2} \cdot 5,3 \cdot 16 \Rightarrow$$

$$S = 8 \cdot 5,3 = 8 \cdot 5 + 8 \cdot 0,3 = 40 + 2,4 \Rightarrow$$

$$S = 42,4 \text{ m}$$