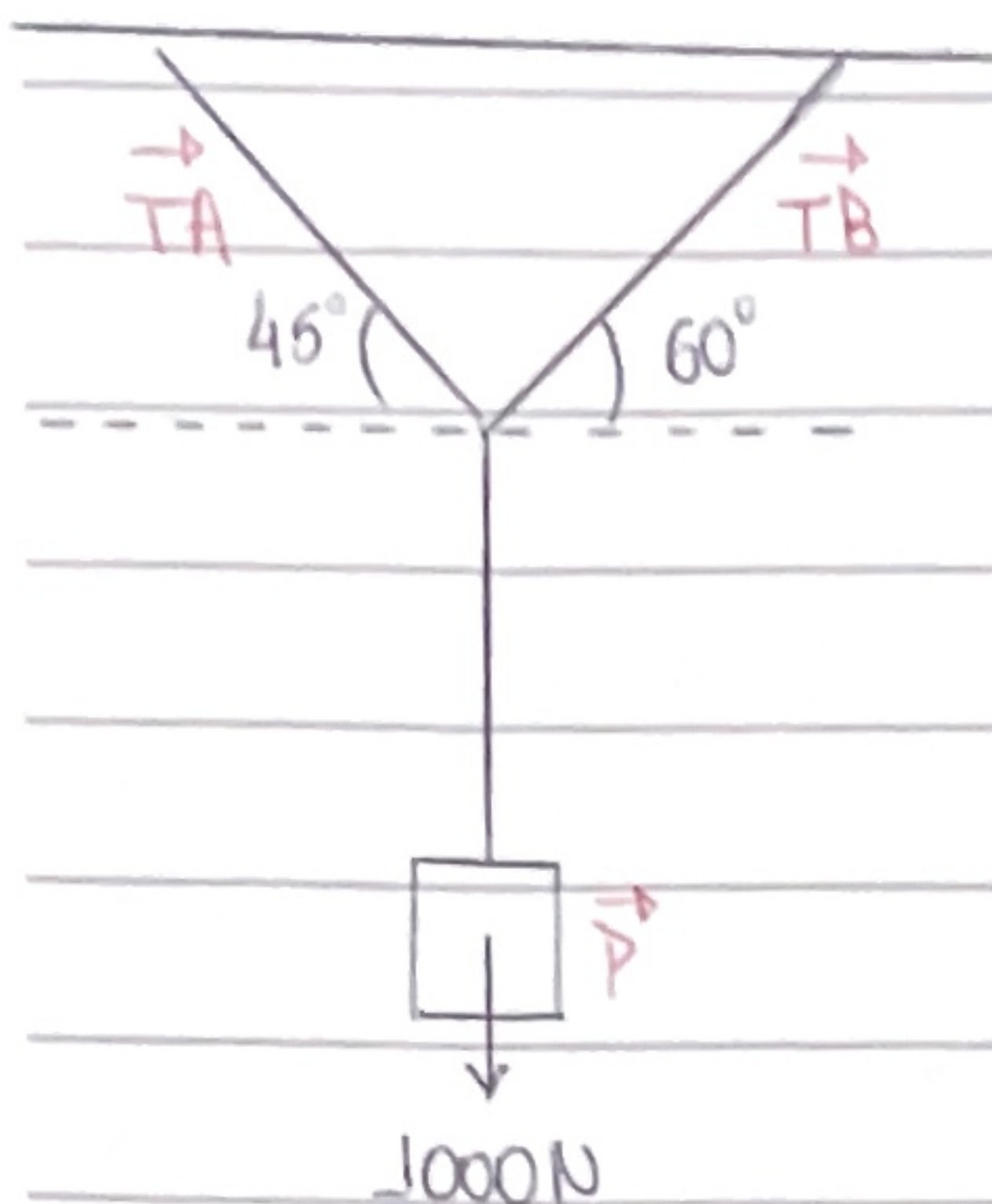


1) $\theta_1 = 45^\circ$ e $\theta_2 = 60^\circ$



$$\sum F_x = 0; \quad T_B \cos 60^\circ - T_A \cos 45^\circ = 0$$

$$T_B = \frac{T_A \cos 45^\circ}{\cos 60^\circ} \Rightarrow T_B = T_A \cdot 1,41$$

$$T_A y + T_B y - P = 0$$

$$\sum F_y = 0; \quad T_A \sin 45^\circ + T_B \sin 60^\circ - 1000 = 0$$

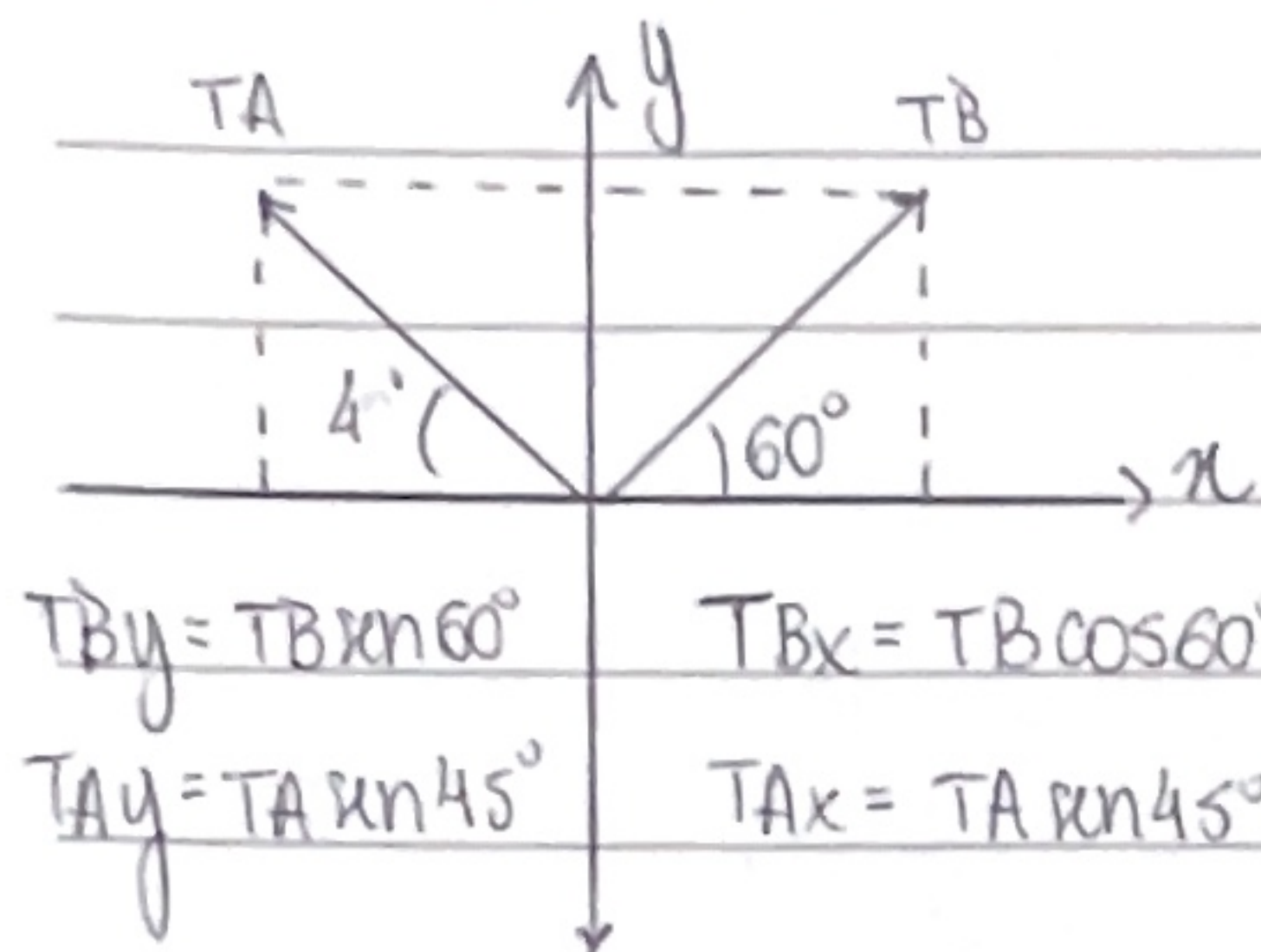
$$T_A \sin 45^\circ + (T_A \cdot 1,41) \sin 60^\circ = 1000$$

$$T_A \sin 45^\circ + 1,22 T_A = 1000$$

$$T_A (\sin 45^\circ + 1,22) = 1000$$

$$T_A = \frac{1000}{\sin 45^\circ + 1,22} = \frac{1000}{1,93} = 518,13 \text{ N} \therefore T_A = 518,13 \text{ N}$$

$$T_B = T_A \cdot 1,41 \Rightarrow T_B = (518,13) \cdot 1,41 \Rightarrow T_B = 730,56 \text{ N}$$



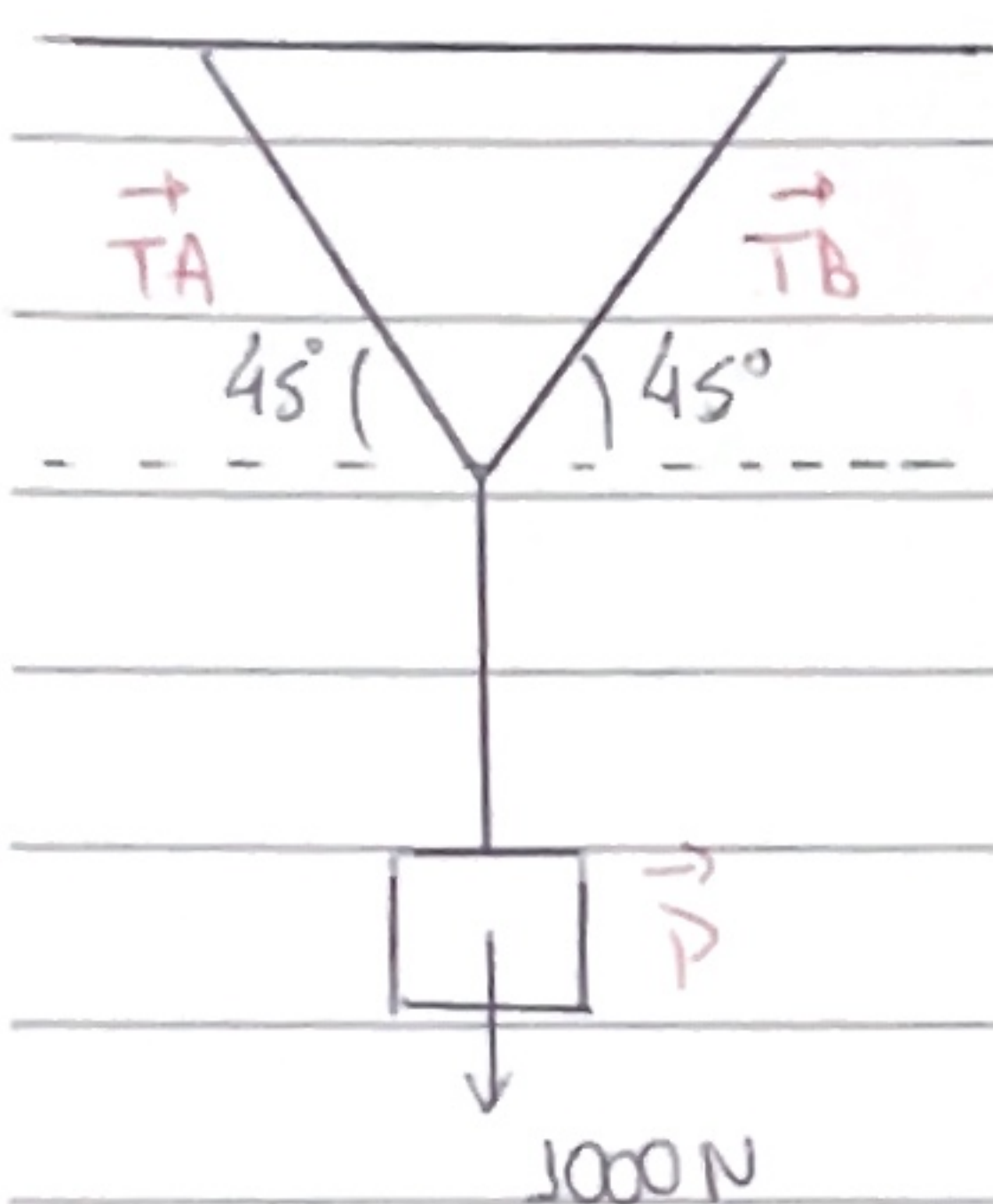
$$T_{By} = T_B \sin 60^\circ$$

$$T_{Bx} = T_B \cos 60^\circ$$

$$T_{Ay} = T_A \sin 45^\circ$$

$$T_{Ax} = T_A \cos 45^\circ$$

2) $\theta = 45^\circ$



$$\sum F_x = 0; \quad T_B x - T_A x = 0$$

$$T_B \cos 45^\circ - T_A \cos 45^\circ = 0 \Rightarrow T_B = \frac{T_A \cos 45^\circ}{\cos 45^\circ} \therefore T_B = T_A$$

$$\sum F_y = 0; \quad T_B y + T_A y - P = 0$$

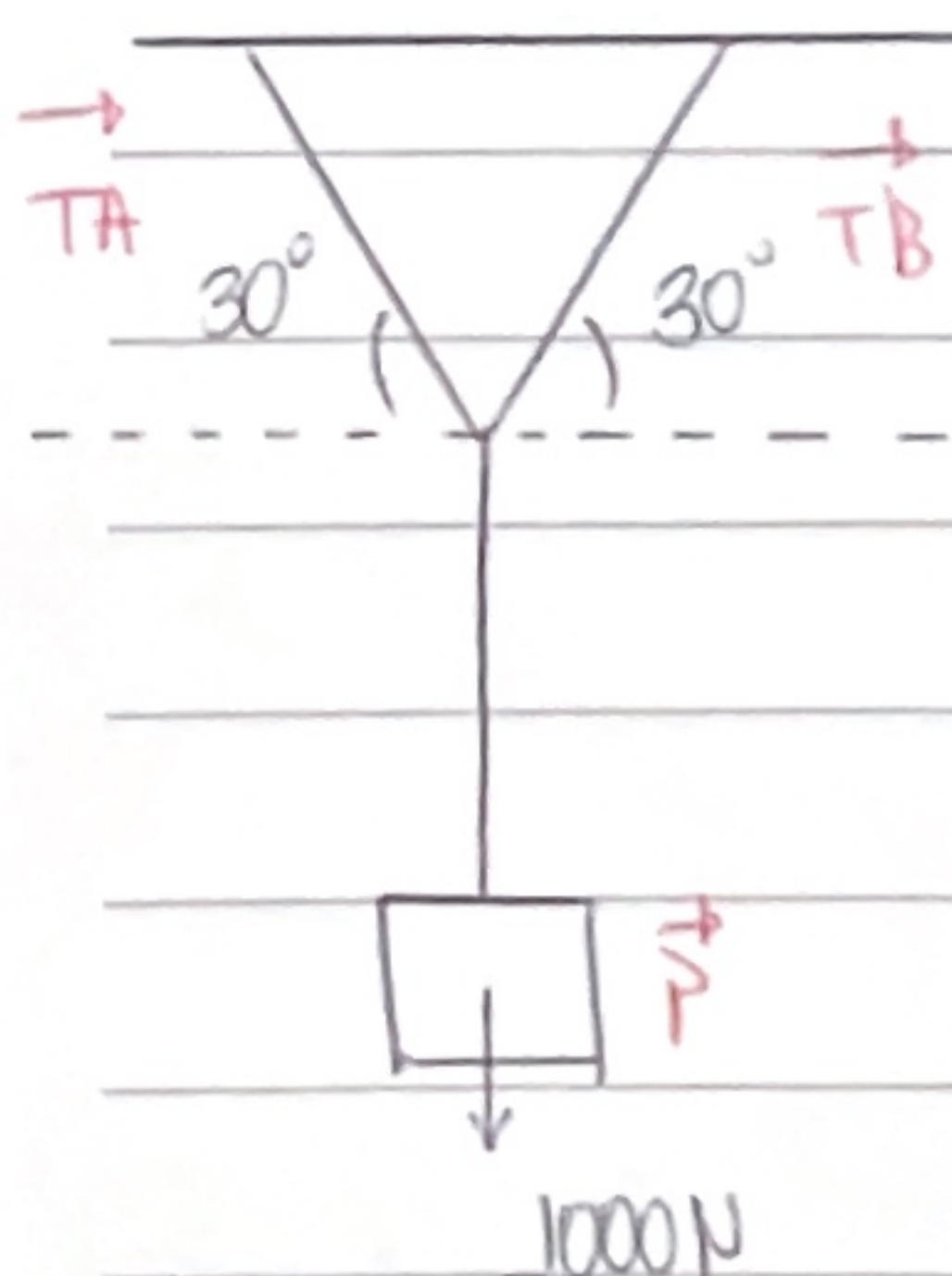
$$T_B \sin 45^\circ + T_A \sin 45^\circ - 1000 = 0 \Rightarrow T_B \sin 45^\circ + T_A \sin 45^\circ = 1000$$

$$(T_A) \sin 45^\circ + T_A \sin 45^\circ = 1000 \Rightarrow 2 T_A \sin 45^\circ = 1000$$

$$T_A \sin 45^\circ = 500 \Rightarrow T_A = \frac{500}{\sin 45^\circ} \Rightarrow T_A = 707,10 \text{ N}$$

$$\text{Como } T_B = T_A, \text{ ent\~ao: } T_B = 707,10 \text{ N}$$

3) $\theta = 30^\circ$



$$\sum F_x = 0; \quad T_B x - T_A x = 0$$

$$T_B \cos 30^\circ - T_A \cos 30^\circ = 0 \Rightarrow T_B = \frac{T_A \cos 30^\circ}{\cos 30^\circ} \Rightarrow T_B = T_A$$

$$\sum F_y = 0; \quad T_B y + T_A y - P = 0 \Rightarrow T_B \sin 30^\circ + T_A \sin 30^\circ = 1000$$

$$(T_A) \sin 30^\circ + T_A \sin 30^\circ = 1000 \Rightarrow 2 T_A \sin 30^\circ = 1000$$

$$T_A = \frac{1000}{2 \sin 30^\circ} \Rightarrow T_A = 1000 \text{ N}$$

$$\text{Como } T_A = T_B, \text{ ent\~ao: } T_B = 1000 \text{ N}$$