

Dane:

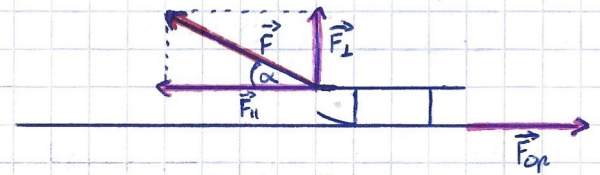
$$m = 30 \text{ kg}$$

$$F = 50 \text{ N}$$

$$F_{op} = 25 \text{ N}$$

$$t = 6 \text{ s}$$

$$\alpha = 30^\circ$$



$$ma = F_{||} - F_{op}$$

$$\cos \alpha = \frac{F_{||}}{F}$$

$$F_{||} = F \cos \alpha$$

$$ma = F_{||} - F_{op}$$

$$ma = F \cos \alpha - F_{op} \quad | : m$$

$$a = \frac{F \cos \alpha - F_{op}}{m}$$

$$S = \frac{1}{2} at^2$$

$$W = F_s \cos \alpha$$

$$W = F \frac{1}{2} at^2 \cos \alpha$$

$$W = F \frac{1}{2} \frac{F \cos \alpha - F_{op}}{m} t^2 \cos \alpha$$

$\vec{F}_{||}$ jest składową poziomą siły z jaką tata działa na sanie

Gdzie W jest praca jaką wykonali tata ciągnąc sanie z siłą \vec{F} po drodze s pod kątem α

$$W = \frac{t^2}{2m} (F \cos \alpha - F_{op}) F \cos \alpha$$

$$W = \frac{t^2}{2m} (F^2 \cos^2 \alpha - F_{op} F \cos \alpha)$$

$$W = \frac{(6s)^2}{2 \cdot 30 \text{ kg}} \cdot \left((50N)^2 \cdot \cos^2 30^\circ - 25N \cdot 50N \cdot \cos 30^\circ \right)$$

$$W = \frac{36s^2}{60 \text{ kg}} \cdot \left((50N)^2 \cdot (0,866)^2 - 25N \cdot 50N \cdot 0,866 \right)$$

$$W = 0,6 \frac{s^2}{\text{kg}} \cdot (2500N^2 \cdot 0,74956 - 1082,5 N^2)$$

$$W = 0,6 \frac{s^2}{\text{kg}} \cdot (1874,89N^2 - 1082,5N^2)$$

$$W = 0,6 \frac{s^2}{\text{kg}} \cdot 792,39N^2$$

$$W = 0,6 \frac{s^2}{\text{kg}} \cdot 792,39 \text{ kg} \cdot \frac{\text{m}}{s^2} \cdot N$$

$$W = 475,434 \text{ m} \cdot N \approx 475 \text{ J}$$

$$\underline{\underline{W = 475 \text{ J}}}$$