## Answer on Question #70162, Physics / Mechanics | Relativity

4.A girl places a stick at an angle of 60.0° against a flat rock on a frozen pond. She pushes at an angle and moves the rock horizontally for 2.00 m across the pond at a velocity of 4.00 m/s and a power of 160.0 W. What force did she apply to the stick? How much work did she do? Your response should include all of your work and a free-body diagram.

**Solution:**

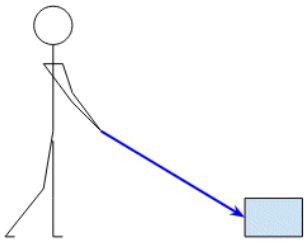
d = 2.00 m

v = 4.00 m/s

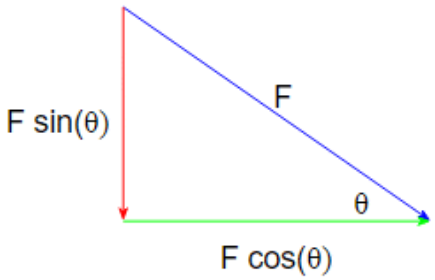
P = 160.0 W

F = ?

W = ?



The free-body diagram is




The power is

$$P = F_x v$$

The force is

$$F_x = \frac{P}{v} = \frac{160\ W}{4\ m/s} = 40\ N$$

$$F_x = F\cos\theta$$

Thus,

$$F = \frac{F_x}{\cos\theta} = \frac{40}{\cos 60.0°} = 80\ N$$

The work is

$$W = (F)(d)cos(\theta) = 80{\times}2.00{\times}\cos 60.0° = 80\ J$$

**Answer:** $80\ N;\quad 80\ J.$