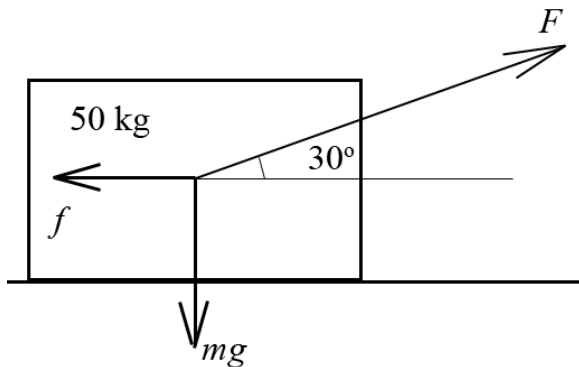


Answer on Question #66272, Physics / Mechanics | Relativity

A 50 kg box is dragged across a floor by pulling on a rope attached to the box and inclined at 30° above the horizontal.

what minimum force magnitude is required from the rope to get the box moving?

Solution



To make the box move, one needs to overcome the static friction f .

$$f = \mu(mg - F \sin 30^\circ) = F \cos 30^\circ;$$

where μ is the coefficient of static friction between the box and the floor.

$$\mu mg - \mu F \sin 30^\circ = F \cos 30^\circ;$$

$$F = \frac{\mu mg}{\cos 30^\circ + \mu \sin 30^\circ};$$

$$F = \frac{\mu \times 50 \times 9.81}{0.866 + 0.5\mu} = \frac{490.5\mu}{0.866 - 0.5\mu}$$

Answer provided by <https://www.AssignmentExpert.com>