

Answers

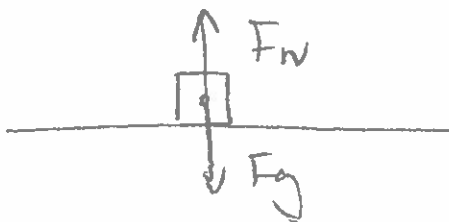
PHYSICS 11

NORMAL FORCE – SUMMARY

- Normal Force is always perpendicular to the surface of contact.
- Normal Force does not exist without the surface of contact.
- Normal force is directed away from the surface of contact.
- Magnitude of the normal force is related to other forces (or vector components of other forces) that are perpendicular to the surface of contact.

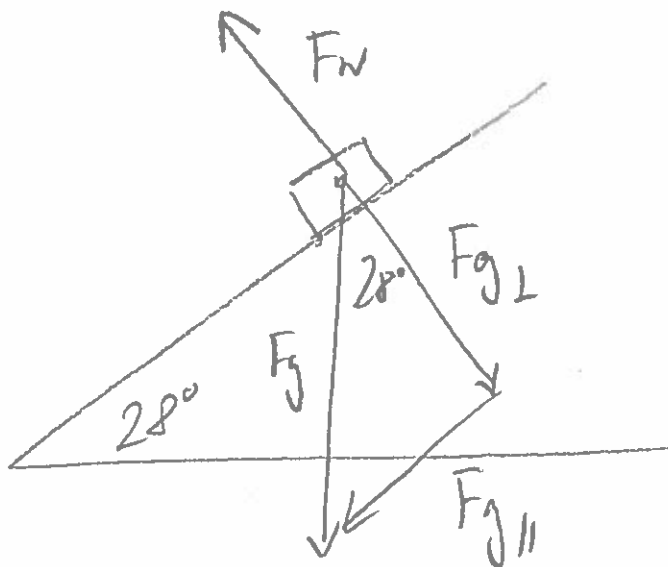
A: Calculate the magnitude of the normal force:

1. A 75.0 kg object lies on a horizontal surface. No other forces are involved.



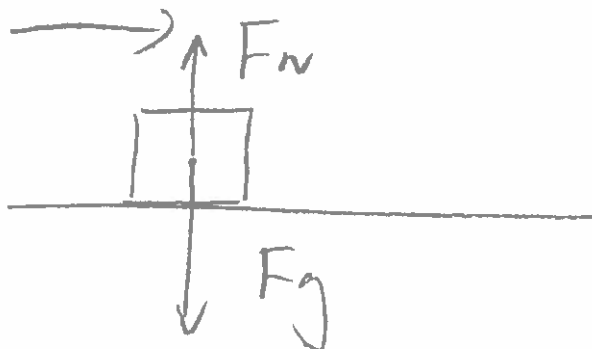
$$\begin{aligned} F_N &= mg \\ &= (75.0)(9.8) \\ &= 735 \text{ N} \approx 7.4 \times 10^2 \text{ N} \end{aligned}$$

2. A 75.0 kg object lies on an inclined plane of 28° . Assume no frictional force.



$$\begin{aligned} F_N &= F_{g\perp} \\ &= mg \cdot \cos \theta \\ &= (75.0)(9.8)(\cos 28^\circ) \\ &= 648.966 \dots \text{ N} \\ &\approx 6.5 \times 10^2 \text{ N} \end{aligned}$$

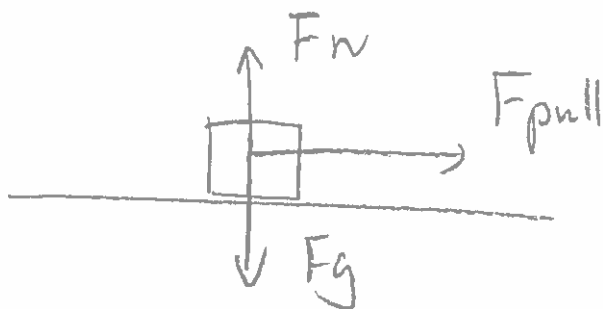
3. A 25.0 kg object is sliding along a frictionless horizontal surface.
motion



$$\begin{aligned} F_N &= mg \\ &= (25.0)(9.8) \\ &= 245 \text{ N} \end{aligned}$$

$$= 2.5 \times 10^2 \text{ N}$$

4. A 30.0 kg object is pulled with $\vec{F}_{\text{pull}} = 25 \text{ N [R]}$ along a frictionless surface.



$$\begin{aligned} F_N &= mg \\ &= (30.0)(9.8) \\ &= 294 \text{ N} \end{aligned}$$

$$= 2.9 \times 10^2 \text{ N}$$