

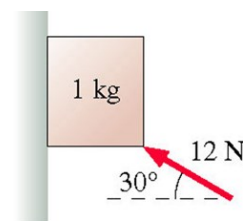
### PCS211 P2022 Tutorial 3

1. A car is travelling along a circular curve that has a radius of 50 m. At  $t = 0$  s, car's speed is 36.0 km/h and is increasing uniformly at a rate of  $8 \text{ m/s}^2$ , determine the following:

- the magnitude of tangential acceleration at  $t = 0$  s.
- the magnitude of the normal acceleration at  $t = 0$  s.
- the magnitude of the net acceleration at  $t = 0$  s.
- the magnitude of tangential acceleration at  $t = 2$  s.
- the magnitude of the normal acceleration at  $t = 2$  s.
- the magnitude of the net acceleration at  $t = 2$  s.

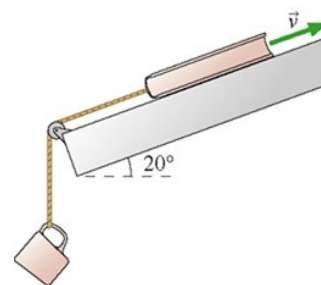
2. It's a snowy day and you're pulling a friend along a level road on a sled. You've both been taking physics, so she asks what you think the coefficient of friction between the sled and the snow is. You've been walking at a steady 1.5 m/s, and the rope pulls up on the sled at a  $30^\circ$  angle. You estimate that the mass of the sled, with your friend on it, is 60 kg and that you're pulling with a force of 75 N. What answer will you give?

3. A 1.0 kg wood block is pressed against a vertical wood wall by the 12 N force shown. If the block is initially at rest, will it move upward, move downward, or stay at rest? Use  $\mu_s = 0.5$  for wood on wood.



4. The 1.0 kg physics book in figure is connected by a string to a 500 g coffee cup. The book is given a push up the slope and released with a speed of 3.0 m/s. The coefficients of friction are  $\mu_s = 0.50$  and  $\mu_k = 0.20$ .

- How far does the book slide?
- At the highest point, does the book stick to the slope, or does it slide back down?



5. The lower block in the figure is pulled on by a rope with a tension force of 20 N. The coefficient of kinetic friction between the lower block and the surface is 0.30. The coefficient of kinetic friction between the lower block and the upper block is also 0.30. What is the acceleration of the 2.0 kg block?

