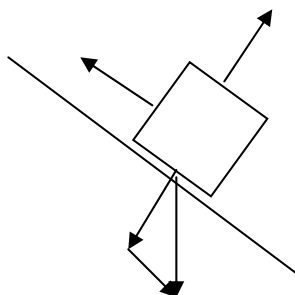


Problem #1

A 75-Kg skier racing downhill reaches a constant velocity. If the hill is sloped at  $24^\circ$ , determine:



a) Complete the freebody diagram and label all vectors



b) Determine the weight ( $F_g$ ) on the skier

c) Circle the two forces PARALLEL to the plane of motion. Determine the force of friction using the coefficient of waxed ski on snow.

d) If the skier has a constant speed of 8 m/s, how much distance does he cover in 10 seconds?

e) The skier reaches the bottom of the hill going 8 m/s and there is no longer a force applied due to gravity. What is the net force in the x-direction parallel to the ground?

f) What acceleration does the skier experience?

g) How long does it take the skier to stop at this rate of acceleration?

## Problem #2

**Show all work (including substitution and units) and circle your final answer).**

A manufacturer's advertisement claims that their 1,250-kilogram (12,300-newton) sports car can accelerate on a level road from 0 to 60.0 miles per hour (0 to 26.8 meters per second) in 3.75 seconds.

- a. Draw a freebody diagram for the car.
  
  
  
  
  
  
  
  
  
  
- b. Determine the acceleration, in meters per second<sup>2</sup>, of the car according to the advertisement.
  
  
  
  
  
  
  
  
  
  
- c. Calculate the net force required to give the car the acceleration claimed in the advertisement. [*Show all work, including the equation and substitution with units.*]
  
  
  
  
  
  
  
  
  
  
- d. What is the normal force exerted by the road on the car?
  
  
  
  
  
  
  
  
  
  
- e. The coefficient of friction between the car's tires and the road is 0.80. Calculate the maximum force of friction between the car's tires and the road. [*Show all work, including the equation and substitution with units.*]

