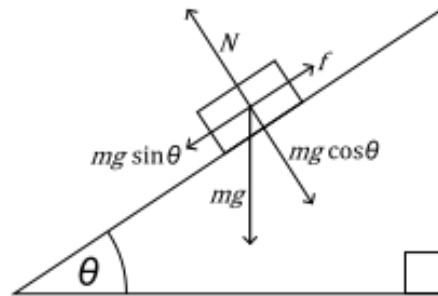


Answer on Question #41297, Physics, Mechanics

A student is helping a teacher unload boxes off a truck at a school. A 6.24 kg box is sliding down the ramp at an angle of 36.1° . The ramp exerts a force of kinetic friction of 7.31N on the box. Calculate the acceleration of the box.

Solution:



Given:

$$m = 6.24 \text{ kg,}$$

$$\theta = 36.1^\circ,$$

$$F_{fr} = f = 7.31 \text{ N,}$$

$$a = ?$$

The equation of motion is

$$ma = mg \sin \theta - F_{fr}$$

where g is the gravity acceleration constant (9.81 m/s^2).

The acceleration is

$$a = g \sin \theta - \frac{F_{fr}}{m}$$

Thus,

$$a = 9.81 \cdot \sin 36.1^\circ - \frac{7.31}{6.24} = 4.609 = 4.61 \text{ m/s}^2$$

Answer. $a = 4.61 \text{ m/s}^2$.