# Inclined Plane Problems

1. A 3.0 m long board has one end raised to a height of 60 cm to form an incline. A 4.0 kg mass is allowed to slide without friction down the entire length of the inclined plane. What is the final speed of the mass when it reaches the bottom?

2. A wooden block slides directly down an inclined plane, at a constant velocity of 6 m/s. How large is the coefficient of kinetic friction if the plane makes an angle of 25° with the horizontal?

3. A 10.0 kg box accelerates at 2.00 m/s$^2$ as it slides down a ramp that makes an angle of 25.0° with the horizontal. Calculate the coefficient of friction.

4. A 10.0 kg box is pulled up a 45° ramp at a constant velocity by a force of 90.0 N acting parallel to the ramp. Calculate the coefficient of friction.

5. A car, with a mass of 1100 kg, can accelerate on a level road from rest to 21 m/s in 14.0 s. What is the steepest slope this car can climb?

6. A 10.0 kg box starts at rest and slides 3.5 m down a ramp inclined at an angle of 10° with the horizontal. If there is no friction between the ramp surface and crate, what is the velocity of the crate at the bottom of the ramp?

7. A 10 kg block is placed on top of an inclined plane 10 m long. The coefficient of static friction is 0.4 and the coefficient of kinetic friction is 0.2. The inclined plane is 30° from the horizontal. What is the acceleration of the block?

8. An object is being pulled up a 15° incline against a frictional coefficient of 0.15 and requires a force of 835 N parallel to the surface of the ramp to move it at a constant speed. What is the weight of the object?

9. The coefficient of static friction between a box and an inclined plane is 0.35. What is the minimum angle required for the box to begin sliding down the incline?

10. A package slides down a 135 m long ramp with no friction. If the package starts from rest at the top and is to have a speed no faster than 19 m/s at the bottom, what should be the maximum angle of inclination?