

Apparent Weight, Normal Force and Friction

1. A 40 kg boy is sitting in a 30 kg wagon. The wagon is being pulled with a 120 N force directed upward at an angle of 45 degrees above the horizontal. What is the normal force between the ground and the wagon?
2. A 105 kg person is standing on a scale in an elevator. What is the apparent weight of the person when the elevator is (a) traveling upward at a constant velocity of 2 m/s, (b) traveling upward with an acceleration of 1.5 m/s², (c) traveling downward with an acceleration of 1.8 m/s²?
3. A 15 kg crate is sitting on the floor and a 50 kg child is standing on top of it. What is the normal force crate exerts on the child and the floor exerts on the crate?
4. A force of 245 N is required to start a mass of 25 kg moving over a rough surface. What is the coefficient of static friction?
5. If a force of 200 N is required to keep the same mass moving at a constant speed on the same surface. What is the coefficient of kinetic friction?
6. A box is dragged up and down a concert slope of 25 degrees to the horizontal. To get the box started up the slope, it requires 6 times the force needed to start the box down the slope. If the force is always parallel to the incline, what is the coefficient of static friction between the box and the incline?
7. A girl is sledding down an icy road. The road makes an angle of 10 degrees with the horizontal. If the coefficient of kinetic friction between the sled and the road is 0.1. With what acceleration will the girl go down the hill? If she starts from rest and the hill is 50 m long, how fast is she moving?
8. The coefficient of static friction between the 8.5 kg block and a 30 degree slope is 0.35 and the coefficient of kinetic friction is 0.30. What force is required to start the block up the incline? What force is required to keep it moving?