

1. A ski jumper starts from rest 50 m above the ground on a frictionless track, and flies off the track at a 45° angle above the horizontal. If the track launch is at a height of 10 m from the ground:
 - a. What is the skier's speed when leaving the track?
 - b. What is the maximum height attained in mid-air relative to the ground?
2. A 25 kg child on a 2.0 m long swing is released from rest when the swing supports make an angle of 30° with the vertical.
 - a. What is the child's total mechanical energy?
 - b. Disregarding friction, find the child's speed at the lowest position.
 - c. If the speed of the child at the lowest position is 2.0 m/s, what is the mechanical energy lost due to friction?

3. A skier starts from the top of an icy 7.34 m hill, and gains speed down the hill without any friction. Once the skier reaches the bottom, the snow is heavier, and creates a coefficient of kinetic friction of .08.
- How fast was the skier going at the bottom of the hill?
 - How far would the skier go horizontally before coming to a full stop?