

Sliding Mass Problems

Draw a force diagram and label the known information for each problem. Use your diagrams to write a valid equation for Newton's Second Law and solve for the unknowns. You will need to use other equations (from Chapter 5) to solve.

1. A loaded snow sled is pulled by six huskies with a force of 1,250 N. Given that the mass of the sled is 500 kg and μ is 0.01, determine:
 - A. Normal force
 - B. Force of friction
 - C. Acceleration of the sled
 - D. Given that it started at rest what would be its velocity after it traveled 20 seconds
 - E. How far did it travel in the first 20 seconds?
2. A person pushes a 500 kg crate with a force of 1200 N and the crate accelerates at 0.5 m/s^2 , determine:
 - A. Friction force
 - B. Normal force
 - C. μ (coefficient of friction)
 - D. What would be the velocity at 10 seconds (given it started at rest)?
 - E. How far did it travel in the first 10 seconds?
3. A 50 kg sled is pulled by a force of 100 N that produces a constant velocity of 2.5 m/s, determine:
 - A. the acceleration
 - B. force of friction
 - C. the net force
 - D. μ
 - E. F_N
4. A 750 N crate is pulled by a rope with a tension of 500 N. If the new force is 200 N, determine:
 - A. Force of friction
 - B. μ
 - C. acceleration
5. The coefficient of sliding friction is 0.02 between a crate and the floor. If the tension force pulling the crate is 500 N and the net force is 300 N, determine:
 - a. force of friction
 - b. normal force
 - c. mass of crate
 - d. acceleration of the crate
 - e. what is the velocity of the crate (if it started from rest) after 2 minutes