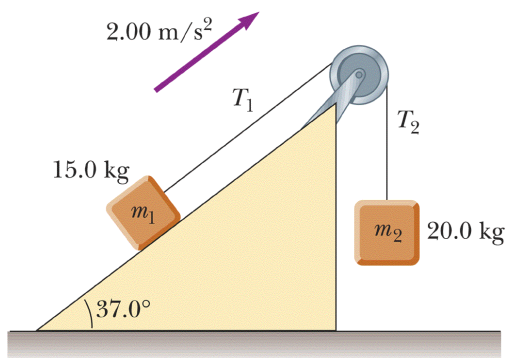


Review Problems for Celebration #1

Problem 1

Two blocks, with masses $m_1 = 15.0$ kg and $m_2 = 20.0$ kg, are connected by a string of negligible mass passing over a massless, frictionless pulley. The block on the incline is moving up with a constant acceleration of 2.00 m/s² as shown in the figure below. Find the coefficient of kinetic friction between block m_1 and the incline. (**Answer: 0.320**)



Problem 2

A 2.0 kg ball is launched at 40.0 m/s at an angle of 35.0° above the horizontal.

- How far from its launch point does the ball land? (**Answer: 151 m**)
- When is the ball's speed equal to 35.0 m/s? (**Answer: $t = 1.1$ s and $t = 3.6$ s**)
- What is the magnitude and direction of the ball's velocity at $t = 3.0$ s?
(**Answer: 33.5 m/s at $\theta = 349^\circ$**)

Problem 3

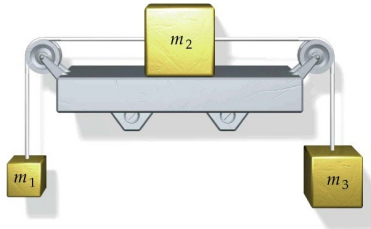
A car drives at a constant speed of 35.0 mi/hr at 30.0° east of north for 2 minutes, then at a constant speed of 20.0 m/s at 25° south of west for 45 s, and finally at a constant speed of 25.0 m/s at 60° south of east for 5 minutes.

- What is the magnitude and direction of the average velocity of the car during this trip?
(**Answer: 14.0 m/s at 306°**)
- What is the average speed of the car during this trip? (**Answer: 22.1 m/s**)

Problem 4

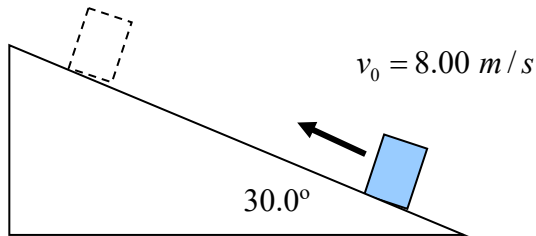
A box of mass $m_2 = 3.5$ kg rests on a frictionless horizontal shelf and is attached by strings to boxes of masses $m_1 = 1.5$ kg and $m_3 = 2.5$ kg as shown in the figure below. Both pulleys are frictionless and massless. The system is initially held at rest.

After it is released, find (a) the acceleration of each of the boxes, and (b) the tension in each string. (Answers: (a) 1.31 m/s²; (b) 16.7 N and 21.2 N)



Problem 5

A 5-kg block is set into motion up an inclined plane with an initial speed of 8.00 m/s. The block comes to rest after traveling 3.00 m along the plane. What is the coefficient of kinetic friction? (Answer: **0.68**)



Problem 6

A falling stone takes 0.30 s to travel past a window 2.2 m tall (see the figure below). From what height above the top of the window did the stone fall (assuming it was released from rest)? (Answer: **1.75 m**)

