Tutorial 2

6) A man lifts a 20.0-kg bucket of concrete from the ground up to the top of a 30.0-m tall building. The bucket is initially at rest, but is traveling at 4.0 m/s when it reaches the top of the building. How much work was done by the man only in lifting the bucket?

A) 5.88 kJ B) 600 J C) 760 J D) 6.04 kJ E) 160 J

A box is sliding down an incline tilted at an angle 14.0° above horizontal. The box is sliding down the incline at a speed of 1.70 m/s. The coefficient of kinetic friction between the box and the incline is 0.380. How far does the box slide down the incline before coming to rest?

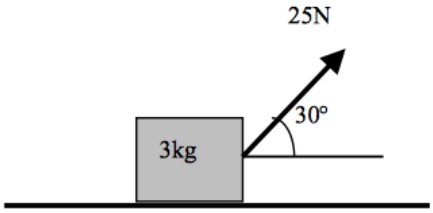
a) 2.33 m
b) 1.16 m
c) 0.720 m
d) 1.78 m
e) The box does not stop. It accelerates down to the plane.

A 50-kg child riding a Ferris wheel (radius = 10 m) travels in a vertical circle. The wheel completes one revolution every 10 s. What is the magnitude of the force on the child by the seat at the highest point on the circular path?

a. 0.69 kN
b. 0.49 kN
c. 0.40 kN
d. 0.29 kN
e. 0.20 kN

A block is pulled on a horizontal frictionless surface with a force (F = 25 N) that makes an angle of 30° with the horizontal as shown. If M = 3 kg, what is the magnitude of the resulting acceleration of the block?

a. 4.2 m/s^2
b. 5.0 m/s^2
c. 7.2 m/s^2
d. 8.3 m/s^2
e. 21.7 m/s^2



An 1100-kg car traveling at 27.0 m/s starts to slow down and comes to a complete stop in 578 m. What is the magnitude of the average braking force acting on the car?

a. No braking force required
b. 340 N
c. 410 N
d. 550 N
e. 690 N

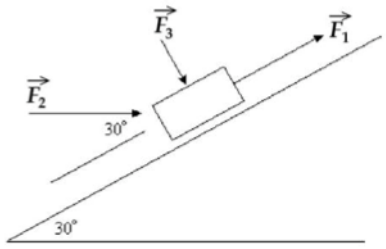
A mass of 2.0 kg traveling at 3.0 m/s along a smooth, horizontal plane hits a relaxed spring. The mass is slowed to zero velocity when the spring has been compressed by 0.15 m. What is the spring constant of the spring?

a. 800 N/m
b. 400 N/m
c. 20 N/m
d. 18 N/m
e. 9.0 N/m

Problems

Three forces, $F1 = 20.0$ N, $F2 = 40.0$ N, and $F3 = 10.0$ N act on an object with a mass of 2.00 kg which can move along a frictionless inclined plane as shown in the figure. The questions refer to the instant when the object has moved through a distance of 0.600 m along the surface of the inclined plane in the upward direction.
Calculate the amount of work done by:

(a) $F1$
(b) $F2$
(c) $F3$



Problem 1) (4 Marks) Two masses, $m_1 = 10.0$ kg and $m_2 = 5$ kg, set on frictionless surface. The two masses are attached by string to mass $m_3 = 7.00$ kg. Then, m_3 is attached to $m_4 = 3$ kg , as in the figure. Consider the string as a perfect massless string. Calculate:

1) The acceleration of the system of the four masses.
2) Find the tension between m_2, and m_3.
3) Find the tension between m_1, and m_2.
4) If $m_1 = m_2 = m_3 = m_4$, then find the value of acceleration of the system of the four masses.