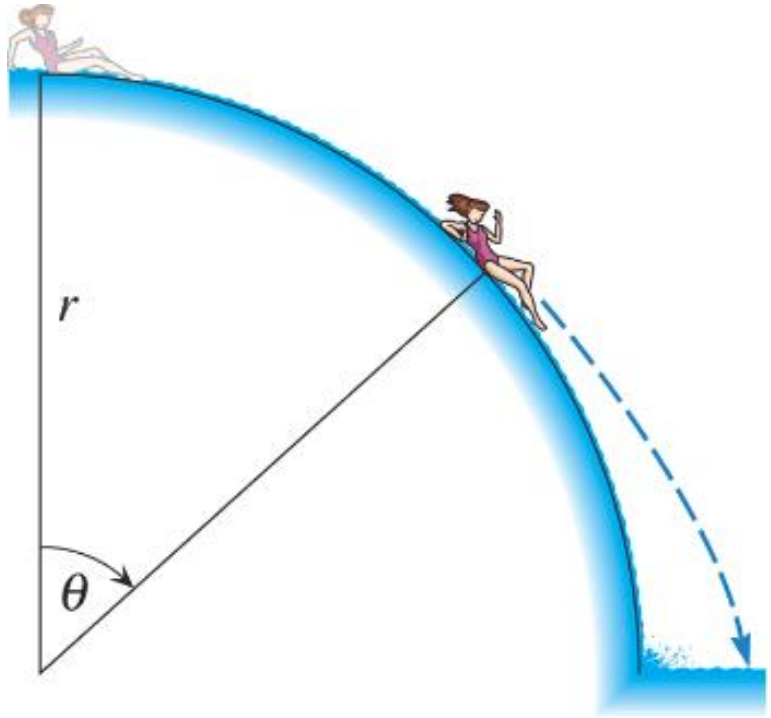
Tutorial 3

Cutnell & Johnson 10th Edition, Problem 6.50

A person slides down from rest a large frictionless spherical surface. At what angle θ does the person leave the surface? When the person leaves the surface, the normal force is zero.

$Ans: 48^o$



Tutorial 3

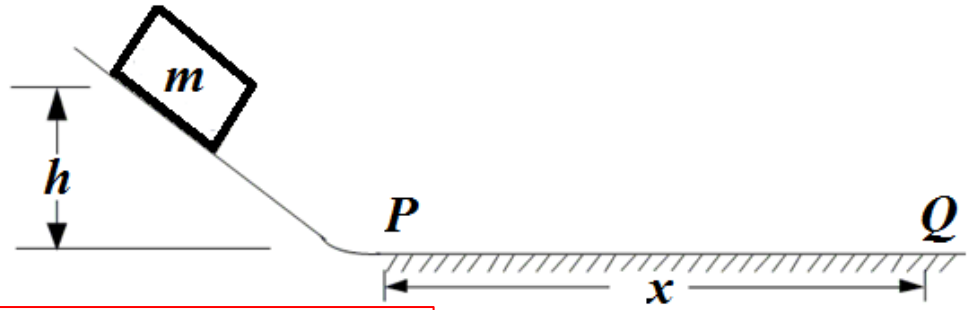
Work done by a nonconservative force

A block of mass *m* slides from rest down a frictionless incline from a height *h*. The section of the horizontal track from P to Q is a rough surface and offers a frictional force to the block. The block comes to a halt at Q.

a) What is the speed of the box just before it reaches point P?

b) What is the work done by the frictional force on the block?

c) If the nonconservative force is the force of kinetic friction, what is the coefficient of kinetic friction?



Ans.:

a) $\sqrt{2gh}$

b) $-mgh$

c) h/x

Tutorial 3

Final, December 15, 2018, Q14

A 100-kg fisherman and a 500-kg supply crate are on a frozen pond that is essentially frictionless. The man and the crate are initially separated by a distance of 600 meters. The fisherman uses a very light rope to pull the crate closer to him. How far has the man moved when the crate reaches the fisherman?

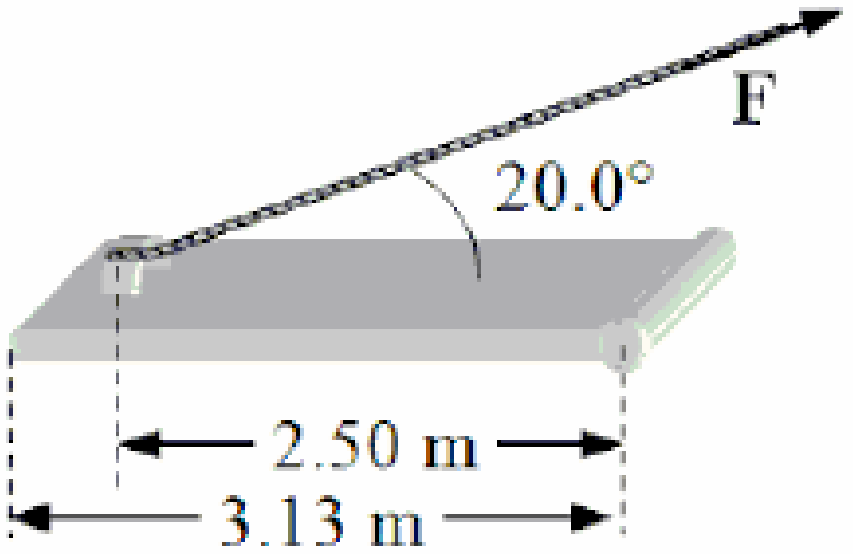
Ans.: 500 m

Tutorial 3

Final, December 19, 2017, Q16

One end of a rope is tied to the handle of a horizontally oriented and uniform trap door. A force $\vec{F}$ is applied to the other end of the rope as shown in the drawing. The door has a weight of 145 N and is hinged on the right. What force $\vec{F}$ is required to begin to open the door?

Ans.: 265 N



Tutorial 3

Final, July 26, 2019, Q18

A *massless* frame in the shape of a square with 2-m sides has a 1-kg ball at each corner. What is the moment of inertia of the four balls about an axis through the corner marked *O* and perpendicular to the plane of the paper?

Ans.: 16 kg.m^2