Corbettmaths

Friction - Inclined Plane

Mechanics

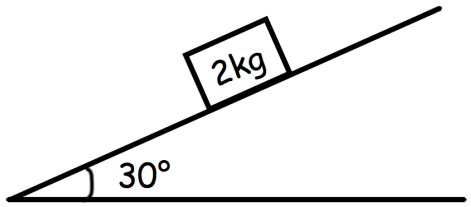
Video Tutorial

If the object is moving (or about to) down the plane, friction will act up the plane.

If the object is moving (or about to) up the plane, friction will act down the plane.

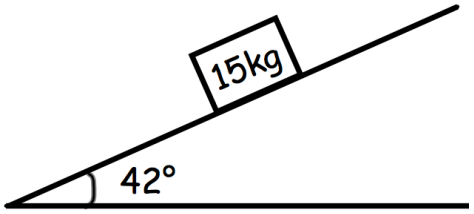
A box of mass 2kg is held on a rough plane that is inclined to the horizontal at an angle of 30°.
The box is released from rest and begins to slide down the inclined plane.
The force due to friction is 1.5N per kg mass.

(a) Mark all the forces acting on the box.
(b) Calculate the normal reaction.
(c) Work out the acceleration of the box.



An object of mass 15kg is held on a rough plane inclined to the horizontal at an angle of 42°.
The object is released from rest and begins to slide down the inclined plane.
The frictional force is 28N

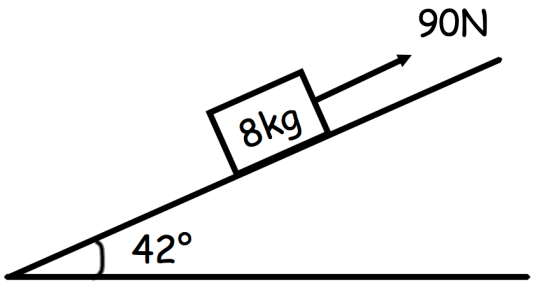
(a) Mark all the forces acting on the object.
(b) Work out the acceleration of the object as it slides down the inclined plane.
(c) Work out the speed of the object 6 seconds after it was released.



Friction - Inclined Plane

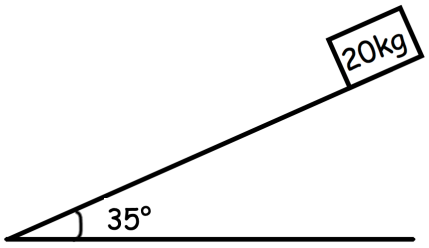
An object of mass 8kg is pulled up an inclined plane by a 90N force.
The frictional force is 20N.

(a) Mark all the forces acting on the object.
(b) Work out the acceleration of the object up the inclined plane.



A dog of mass 20kg slides from rest down a slide.
The frictional force is 0.3N per kg.
The slide is inclined to the horizontal at an angle of 35°
It takes the dog 2.4 seconds to slide from the top to the bottom of the slide.

(a) Work out the dog's acceleration.
(b) Work out the speed of the dog at the bottom of the slide.
(c) How long is the slide?



An object of mass 30kg is projected up a rough inclined plane at a speed of 18m/s
The object comes to rest after 2.5 seconds.

(a) Calculate the deceleration of the object.
(b) Calculate force due to friction.

