Worksheet - Incline Planes

1   A 562 N truck slides down a frictionless plane inclined at an angle of 30.0º from the horizontal.
     A   Find the acceleration of the trunk.
     B   Find the acceleration of the trunk if the coefficient of friction was 0.30.

2   A coin placed on the cover of a book just begins to move when the cover makes an angle of 38º with the horizontal. What is the coefficient of static friction?

3   A car weighing 1.2×10^4 N is parked on a 36º slope. The brakes fail and the car starts to slide down the hill. Assume no friction.

     A   What is the acceleration of the car?
     B   After it has moved 30.0 m, how fast is it moving?

4   A 35 N object is on an 25º incline. The force of friction up the incline is 8.0 N.
     A   What is the acceleration of the block?
     B   What is the coefficient of kinetic friction?

5   An incline plane has $\theta = 40.0º$ and $\mu_k = 0.15$. Starting from rest, how long will it take a 4.0 kg block to reach a speed of 12 m/s?

6   A 20.0 kg box sits on an incline. μ_k is 0.30, $\theta = 30.0º$. Find the acceleration of the block.

7   A 12 kg block is released from the top of an incline that is 5.0 m long and makes an angle of 40.0º to the horizontal. A force of friction of 60.0 N impedes the motion of the box.

     A   Find the acceleration of the box.
     B   How long will it take the box to reach the bottom of the incline?
     C   What is the coefficient of friction?

8   An incline plane makes an angle of 30.0º with the horizontal.
     A   the force required to cause a 15 kg box to slide up the plane with an acceleration of 1.2 m/s².
     B   the force required to cause a 15 kg box to slide down the plane with an acceleration of 1.2 m/s².