**Force of Friction and Hook’s Law Problem Set**

1. a) Where on a bicycle do you want to reduce friction? How is this done?

b)    Where on a bicycle do you want friction?

2.     a)   What is meant by the coefficient of kinetic friction?

b)    Why is there no units attached to values of ?

c)     A force of 120 N is needed to push a box along a road at a steady speed. If the force of gravity on the box is 250 N, what is the coefficient of kinetic friction between the box and the road?

3.     The coefficient of kinetic friction between a steel block and an ice rink surface is 0.0100. If a force of 24.5 N keeps the steel block moving at steady speed, what is the force of gravity on the block?

4.     A boy exerts a 36.0 N horizontal force as he pulls a 52.0 N sled across a cement sidewalk at constant speed. What is the coefficient of kinetic friction between the sidewalk and the metal sled runners? Ignore air resistance.

5.     Suppose the sled from question 4 now runs on packed snow. The coefficient of friction is now only 0.12. If a person weighing 650.0 N sits on the sled, what force is needed to pull the sled across the snow at constant speed?

6.     The coefficient of friction between two surfaces is 0.34. If a person experiences a force of friction of 540 N, what is their weight?

Solutions

1.     a)   **Axels with grease** b)    **Tires on the road, brakes**

2.     a)   **Ratio of frictional force to normal force (or force of gravity) which represents a relative amount of roughness for 2 surfaces rubbing against each other** b)    **It is a ratio! Therefore, no units.** c) **0.48**

3.    **2450 N** 4.     **0.692** 5.     **Ffr  =  84.0 N** 6    **Fg  =  1590 N**