Friction (Static and Kinetic)

A crate resting (motionless) on a level surface has a mass of 80 kg. The coefficient of static friction is 0.6. The coefficient of kinetic friction is 0.4. Answer the following questions:

1. How big is the normal force acting on the crate? 784N

1. What object exerts the normal force on the crate? SURFACE

*Now, a person pushes to the right, attempting to make the crate slide*

1. How hard must the person push to get the crate to start sliding? (explanation, not numbers, and a FBD would be helpful!)

 FA MUST EXCEED THE MAXIMUM STATIC FRICTION FORCE

1. Once they get the crate sliding, what must the person do to keep the crate sliding at a constant velocity? (explanation, not numbers!)

 FA MUST EQUAL THE KINETIC FRICTION FORCE

1. Find the numerical answers for #3 and #4

 To start a slide, Fa > 470.4N

To keep it sliding, Fa = 313.6N

*The crate is once again at rest.*

1. If the person exerts 10 N of force horizontally, how much friction is acting on the crate? 10N

1. What object exerts the friction force on the crate? SURFACE

8 If the person exerts 30 N of force on the crate, how much friction is acting on the crate? 30N

9. If the person exerts 500 N of force on the crate, how much friction acts on the crate? 313.6N (hint: analyze this question carefully before answering!!)

Since 500N exceeds the max static friction, the object slides, so it will have KINETIC friction – and that has been computed to be 313.6N.