

Name: _____ Date: _____ Period: _____

Study Guide - Friction and Forces in 2D

Concepts to know!

C1 – Friction between two surfaces that are sliding (kinetic friction) is different than surfaces that are not sliding (static friction). Kinetic friction is constant regardless of how fast the surfaces are sliding. Static friction has a maximum amount, but it can change to balance other forces being applied up to that maximum amount. In order to get an object to slide, a force needs to be applied that is more than the maximum static friction; then sliding will occur and the friction will become kinetic. The maximum amount of static friction is always greater than or equal to kinetic friction.

C2 – An equilibrium force is the one force that will balance all of the other forces acting on a system.

Define the following

Balanced Forces:

Unbalanced Forces:

Net Force:

Equilibrium:

Static Friction:

Kinetic Friction:

Acceleration:

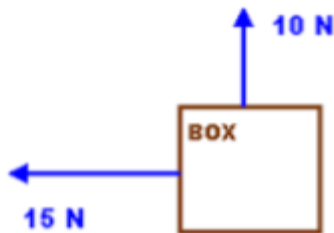
Free-Body Diagram

Practice Questions:

If a man is pulling a suitcase down the hall at the airport at a constant velocity, what is the net force of the suitcase?

If an object has a net force in the x-direction, what is the direction of the acceleration.

If an object has a net force in the y-direction, what is the direction of the acceleration.



The box shown on the left has two applied forces. A 10N force pushing to the North and a 15N force pushing to the left.

What is the resultant applied force?

What is the magnitude of a force needed in the **North-South** direction, to put the box in equilibrium.

Draw the free body diagram of a car parked on a steep hill.

A 30kg box is being pushed to the East with an applied force of 150N. The box is moving with an acceleration of 1.5 m/s^2 .

Draw the free body diagram of the moving box. (label all the forces)

What is the normal force on the box?

What is the net force?

What is the frictional force?

What is the coefficient of friction?

Determine the frictional force of a 60 kg box that is sliding across the floor with a coefficient of friction of 0.2

A box is being pushed North with a force of 45N, and is also being pushed to the East with 66 N. What is the resultant force on the box (include direction)?

A wagon is being pulled down the road. What is the total applied force exerted on the wagon is the x-component of the force is 89N and the y-component is 102N?

A 45kg box is being pushed to the East with an applied force of 200N. The box is moving with an acceleration of 1.5 m/s^2 .

Draw the free body diagram of the moving box. (label all the forces)

What is the normal force on the box?

What is the net force?

What is the frictional force?

What is the coefficient of friction?