Determining the Acceleration
Lesson Notes

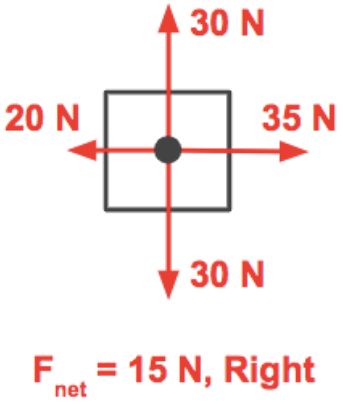
Newton's Second Law:
The acceleration of an object is ...

- **Directly proportional** to the **net force** that acts upon it, and
- **Inversely proportional** to the **mass** of the object, and
- In the **same direction as** the **net force**.
- The law is expressed by the equation **$a = F_{net} / m$**

What is Net Force?
The **net force** is sometimes referred to as *the vector sum of all the forces*.

As shown at the right, the four forces add up to 15 N, right.

Net force, like any force, is a vector; it has a direction.

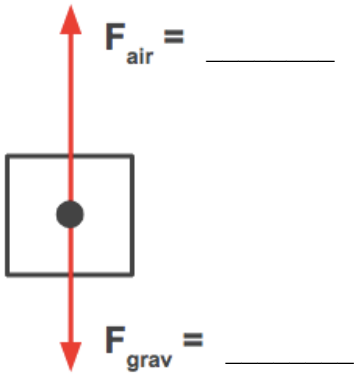


Example 1:
A 50.0-kg skydiver experiences a 740-Newton air resistance force. Determine her acceleration.

Solution:

Finding the Net Force:

Finding the Acceleration:

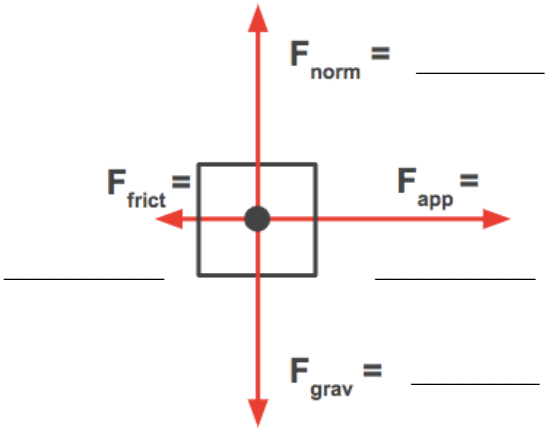


Example 2:
A rightward force of 46.8 N is applied to a 4.0-kg object. There is 14.8 N of friction. Determine the acceleration.

Solution:

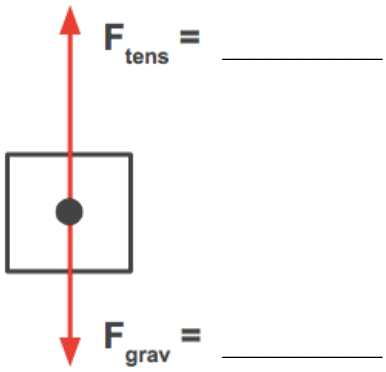
Finding the Net Force:

Finding the Acceleration:



Example 3:

A 55.8-N tension force is used to pull a 4.50-kg bucket out of a well. Determine the bucket's acceleration.



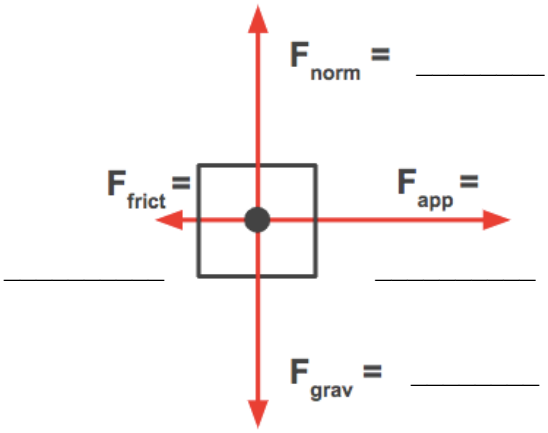
Solution:

Finding the Net Force:

Finding the Acceleration:

Example 4:

A 410-N rightward force is applied to a 62-kg object. There is 193 N of friction. Determine the acceleration.



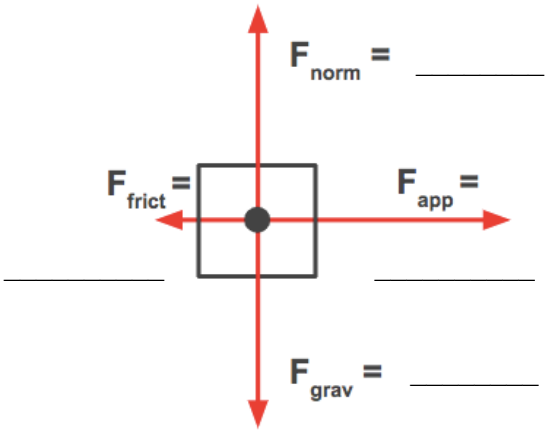
Solution:

Finding the Net Force:

Finding the Acceleration:

Example 5:

A 525-N rightward force is applied to a 637-N object. The coefficient of friction is 0.400. Determine the acceleration.



Solution:

Finding the Net Force:

Finding the Acceleration: