# Newton’s Third Law

#  $F\_{x}=Fcos\left(θ\right), F\_{y}=Fsin(θ)$

Content

Force, like any vector, can be broken up into its component vectors using trigonometry. Breaking a force into its components allows us to easily determine the magnitude of the force in each direction and ultimately determine the motion of the object in that direction too (which we will learn about soon).

Using trigonometry, we can create an equation for the x-component of a force and the y-component of a force. From the diagram above:

$$ F\_{x}=Fcos\left(θ\right)$$

# $$F\_{y}=Fsin(θ)$$

Now instead of using trigonometry for each individual case, we can jump straight to these already derived force component equations.

Example 1

There is a pulling force on a block that is 20.0N and at an angle of 30° to the horizontal, as in the diagram below. What are the x (horizontal) and y (vertical) components of this force?

* Using the equation above for the x-component of the force we find:
* Repeating for the y-component we find:

Example 2

Diego’s car broke down and now they need to push it to the end of the street. Diego pushes the car with a force of 400N at an angle of 45° to the horizontal. Calculate the x-component of Diego’s push. Given the force required to move the car forward is at least 200N, is Diego’s push large enough in the x-direction to move the car forward?

* Using the equation for the x-component of the force we find:
* And, to see if this is sufficient for the car to move forward: