

# Newton's 1<sup>st</sup> Law & Net Force

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IB PHYSICS | FORCES

# What is a Newton??



# REMINDER: Vector vs Scalar

## Vector Quantities

Displacement

Velocity

Force

Can be negative to indicate direction

## Scalar Quantities

Distance

Speed

Energy

Only Positive

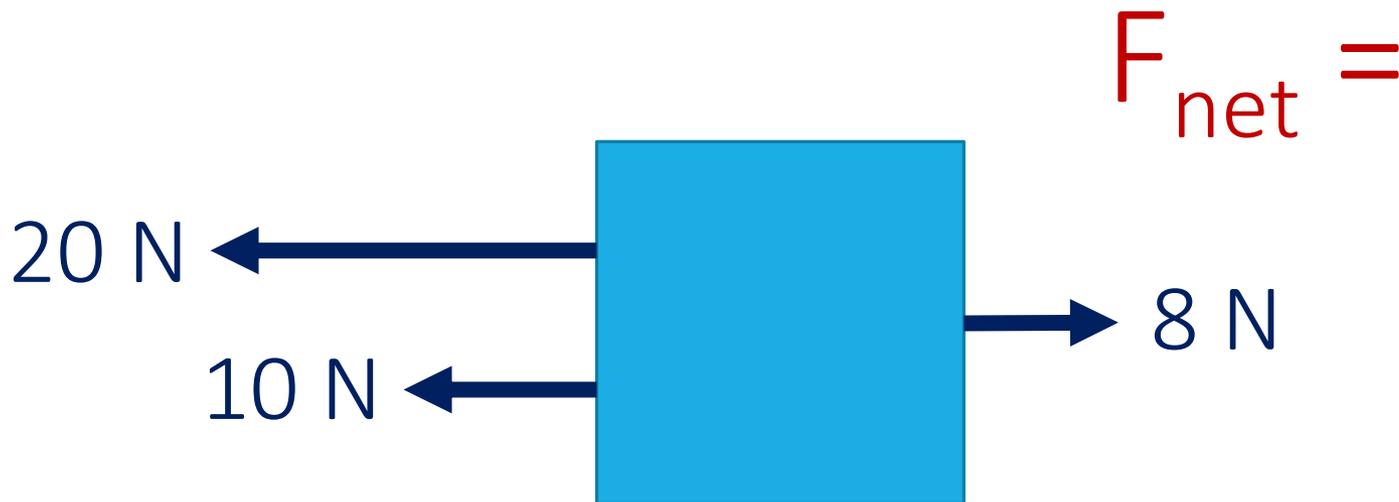
# Newton's First Law

A body will remain at rest or moving with constant velocity unless acted upon by an unbalanced force



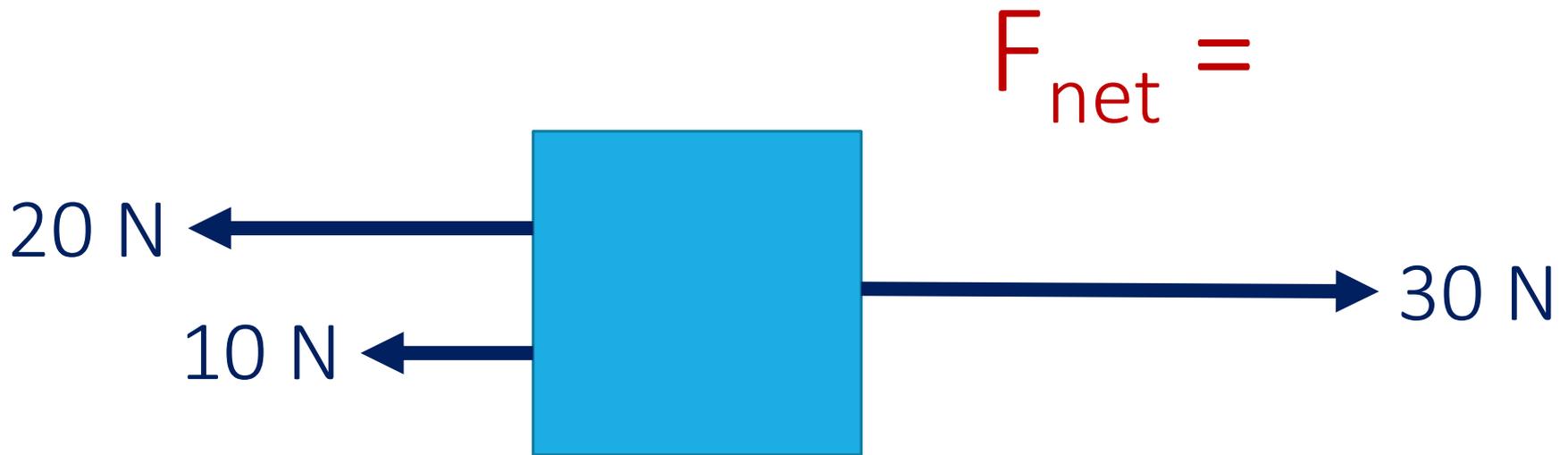
# Net Force

The vector sum of all the forces acting on an object



# Equilibrium

When all forces cancel out, the object is in equilibrium



# Using Equilibrium



What is the tension force on the second cable if the window washers are in equilibrium?

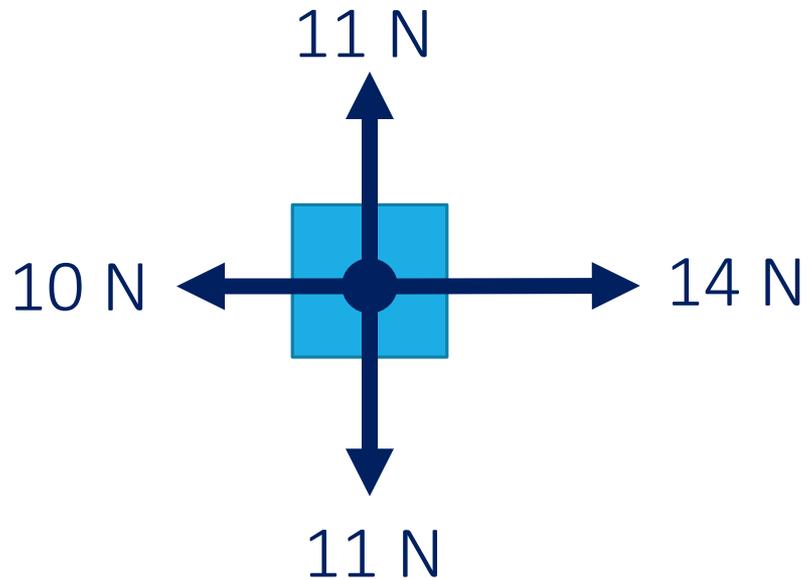
$$F_{net} = 0 \text{ N}$$

Weight of Guy #1 = 750 N

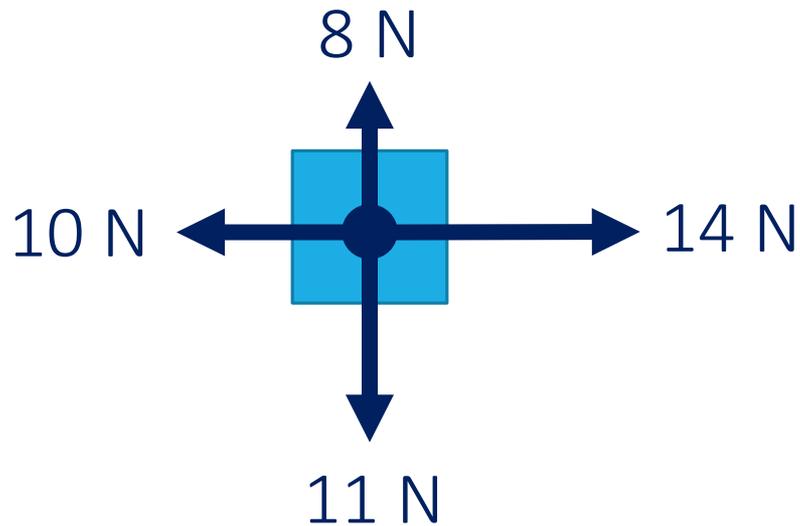
Weight of Guy #2 = 800 N

Weight of Platform = 900 N

# What is the Net Force? | 1

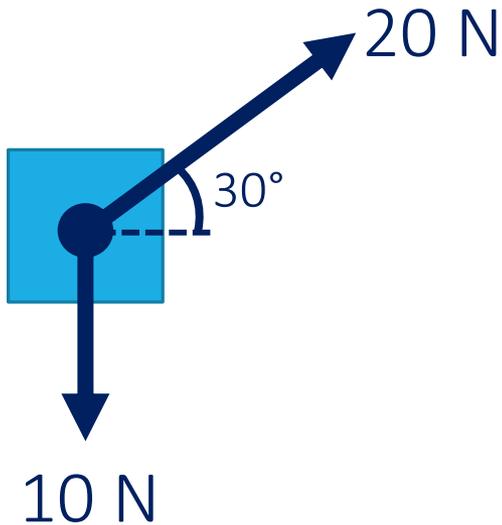


# What is the Net Force? | 2



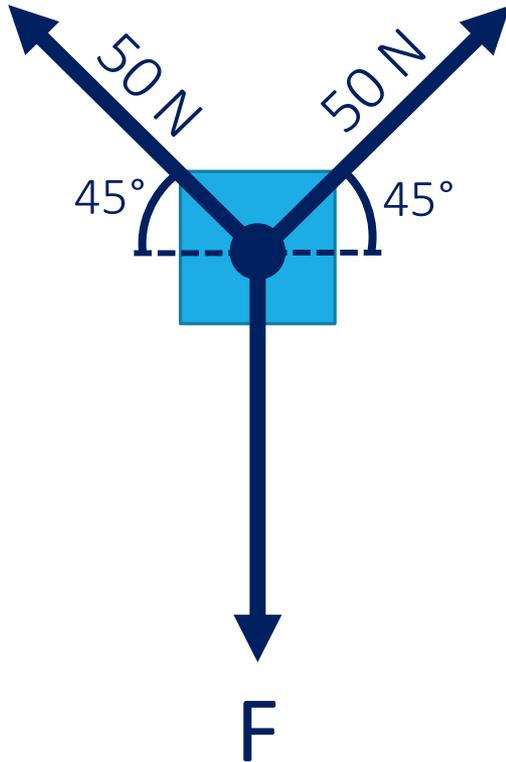
# What is the Net Force? | 3

*Remember SOHCAHTOA?*



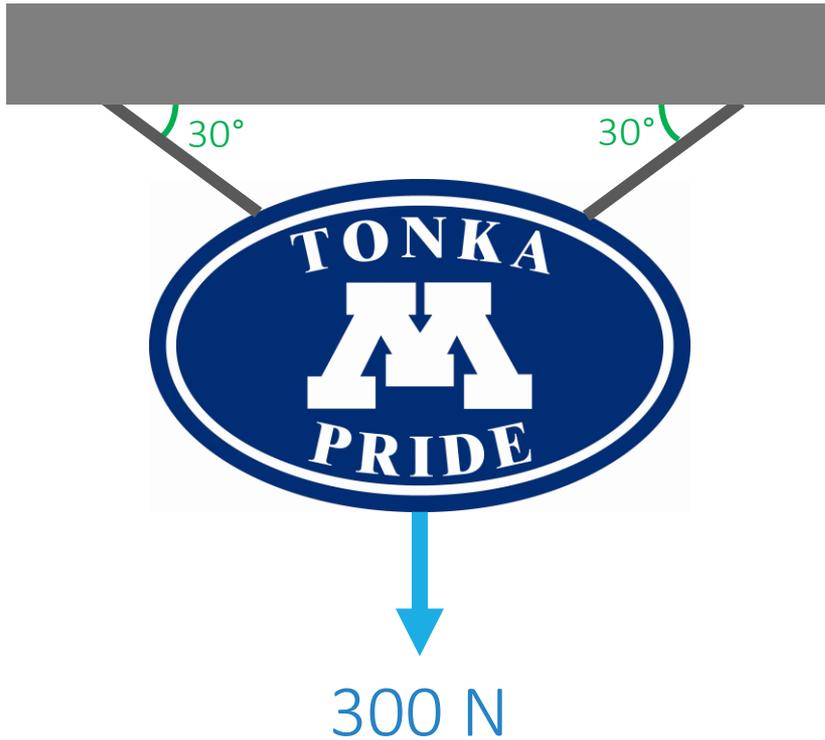
# What is the Missing Force?

$$F_{\text{net}} = 0 \text{ N}$$



# Cable Tension

What is the tension of these cables?



# Lesson Takeaways

- I can define a force (with proper units) in terms of the interaction between two objects
- I can describe Newton's first law
- I can calculate the net force on an object
- I can calculate an unknown force for an object in equilibrium