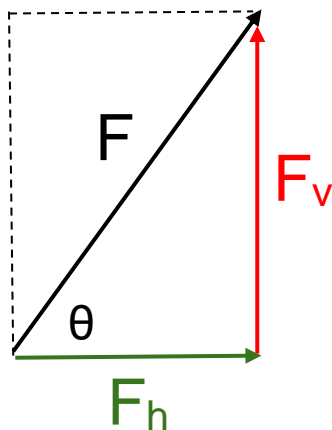


Resolving forces



As shown in the diagram, F is the resultant force of F_h and F_v . If these two forces act together on an object, one pulling to the right (F_h) and one pulling upward (F_v), then the resultant force, F is pulling up and to the right.

Resolving forces is like the reverse process of finding a resultant force - we take a force that's acting at an angle and work out how much force is pulling sideways and how much is pulling up or down.

Any diagonal force F can be resolved into two perpendicular forces - a horizontal component and a vertical component.

At GCSE, you can always resolve forces by using a scale diagram. Alternatively, you can use trigonometry to calculate the horizontal and vertical components.

Remember SOHCAHTOA and look at the triangle above.

$$\begin{aligned}\sin\theta &= F_v / F & \rightarrow & F_v = F\sin\theta \\ \cos\theta &= F_h / F & \rightarrow & F_h = F\cos\theta\end{aligned}$$

(Take care with this: the horizontal component isn't always $F\cos\theta$ and the vertical component is not always $F\sin\theta$. It depends on which angle you are given, so you will always need to draw a diagram and consider each situation individually.)

Practice:

Find the size of the horizontal and vertical components of the following forces:

- A force of 100N up and to the right, at 30° to the horizontal.
- A 500N force down and to the left, at 40° to the vertical.
- A 160N force up and to the left, at 25° to the horizontal.