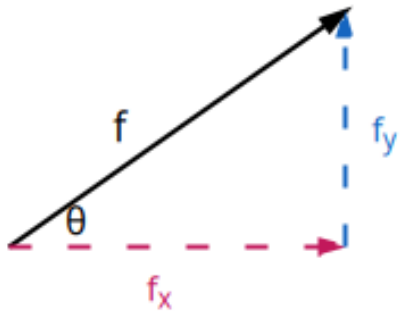
4.5 Resolution of Vectors into Rectangular Components Lesson

This document was composed and formatted by Annie Bernatchez.

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Resolving a Vector into its Components

In many situations involving forces, we are interested in a process that is the opposite of composition. This process is called _____, which means taking a single force and decomposing it into two components. When we resolve a force into two components, it is possible to do this in an infinite number of ways because there are infinitely many parallelograms having a particular single force as the diagonal. However, the most useful and important way to resolve a force vector occurs when this vector is resolved into two components that are at right angles to each other. These components are usually referred to as the horizontal and vertical components or _____.

If $\vec{f}$ is resolved into its respective horizontal and vertical components, $\vec{f_x}$ and $\vec{f_y}$, then: $\lvert\vec{f_x}\rvert$ = $\lvert\vec{f_y}\rvert$ = Where θ is the angle that $\vec{f}$ makes with the x-axis.	

Example 1: A tow truck is pulling a car from a ditch. The tension in the cable is 15 000 N at an angle of 40° to the horizontal.

a) Draw a diagram showing the resolution of the force into its rectangular vector components.

b) Determine the magnitudes of the horizontal and vertical vector components of the force.

Example 2: Kayla pulls on a rope attached to her sleigh with a force of 200 N. If the rope makes an angle of 20° with the horizontal, determine:

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Example 2: Kayla pulls on a rope attached to her sleigh with a force of 200 N. If the rope makes an angle of 20° with the horizontal, determine:

a) the force that pulls the sleigh forward $= |\vec{f_x}|$

b) the force that tends to lift the sleigh $= |\vec{f_y}|$

Example 3: A box weighing 140 N is resting on a ramp that is inclined at an angle of 20°. Resolve the weight into rectangular vector components that keep the box at rest.

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