

Resolution of a Vector into two components at right angles (90 degrees) to each other

$$\text{Horizontal Component} = F_x = F \cos(\text{angle})$$

$$\text{Vertical Component} = F_y = F \sin(\text{angle})$$

Resolution of Vectors into Components

- Position the given vector, F , with its tail at the origin $(0, 0)$.
- The Head points out into the x - y coordinate plane. The angle that the vector makes with the x -axis is the angle of interest.
- Horizontal (east-west) component:
 $F\cos(\text{angle})$
- Vertical (north-south) component: $F\sin(\text{angle})$

Example

- Given a Force Vector of 20 Newtons.
- Place the tail at the origin (0, 0).
- Place the head at various angles above the X-axis in the x-y coordinate plane.
- If angle = 30 degrees, $F_x = 20\cos(30) = 17 \text{ N}$
- $F_y = 20\sin(30) = 10 \text{ N}$
- If angle = 45 degrees, $F_x = 20\cos(45) = 14 \text{ N}$
- $F_y = 20\sin(45) = 14 \text{ N}$

Group Activity

- Given a Force Vector, $F = 50$ Newtons with its tail at the origin $(0, 0)$. Find the components F_x and F_y for various angles above X-axis.
- 0 degrees
- 10 degrees
- 20 degrees
- 30 degrees
- 45 degrees
- 60 degrees
- 75 degrees
- 90 degrees
- 135 degrees
- 180 degrees