

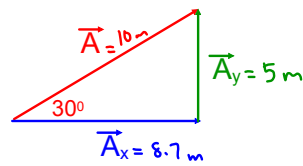
Adding Vectors Algebraically II (Using Components)

Goal for this class:

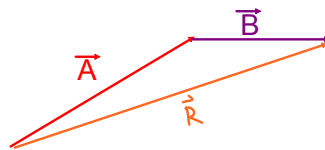
- to add any vectors algebraically

Last class, we found the horizontal and vertical components of the following vector:

$$\begin{aligned}\vec{A} &= 10 \text{ m [E}30^\circ\text{N]} \\ &= 8.7 \text{ m [E]} + 5 \text{ m [N]}\end{aligned}$$



Given $\vec{B} = 3 \text{ m [E]}$, find $\vec{A} + \vec{B}$



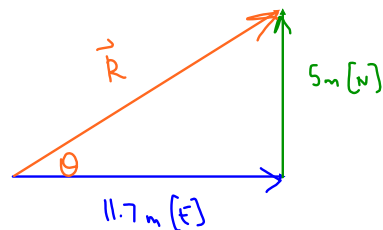
$$\vec{A} = (8.7, 5) \quad \vec{B} = (3, 0)$$

Sum horizontal components:

$$\Delta x = 8.7 + 3 = 11.7 \text{ m}$$

Sum vertical components:

$$\Delta y = 5 + 0 = 5 \text{ m}$$



$$\|\vec{R}\| = \sqrt{11.7^2 + 5^2}$$

$$= 12.7 \text{ m}$$

$$\vec{R} = 12.7 \text{ m [E } 23^\circ \text{ N]}$$

$$\theta = \tan^{-1}\left(\frac{5}{11.7}\right)$$

$$\theta = 23.1^\circ$$

To add any vectors:

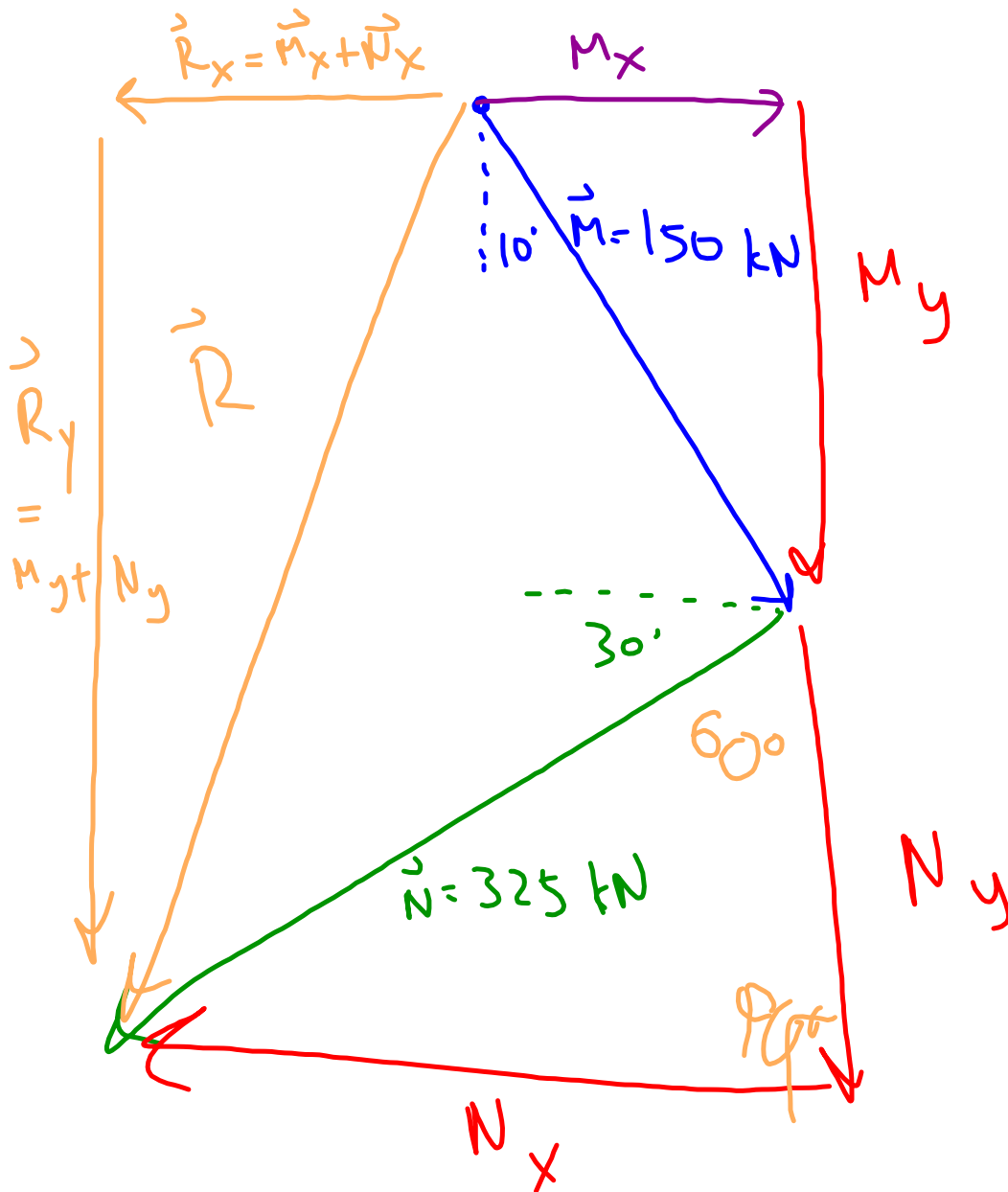
- find the horizontal and vertical components of each vector
- find the sum of all horizontal components
- find the sum of all vertical components
- use pythag and trig to find magnitude and direction of resultant

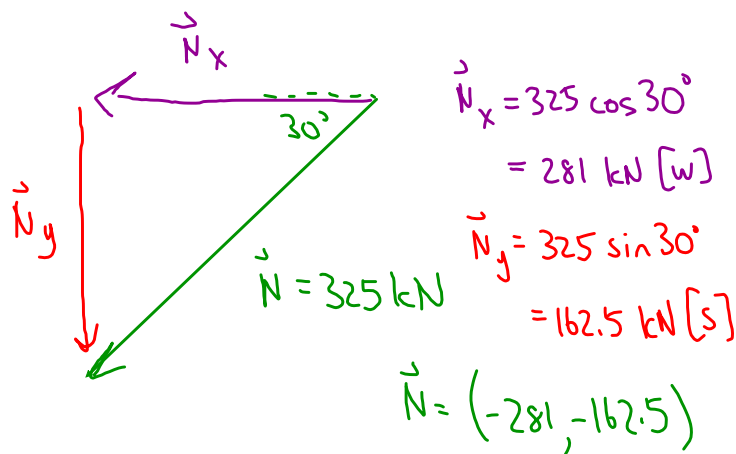
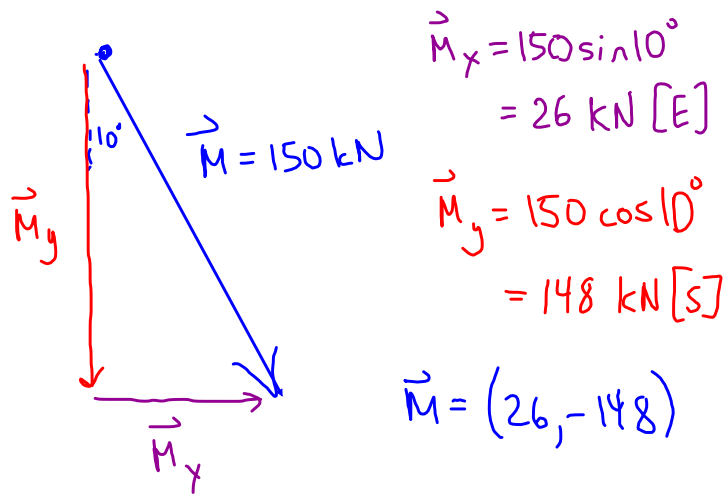
Given:

$\vec{M} = 150 \text{ kN [S}10^\circ\text{E]}$ and

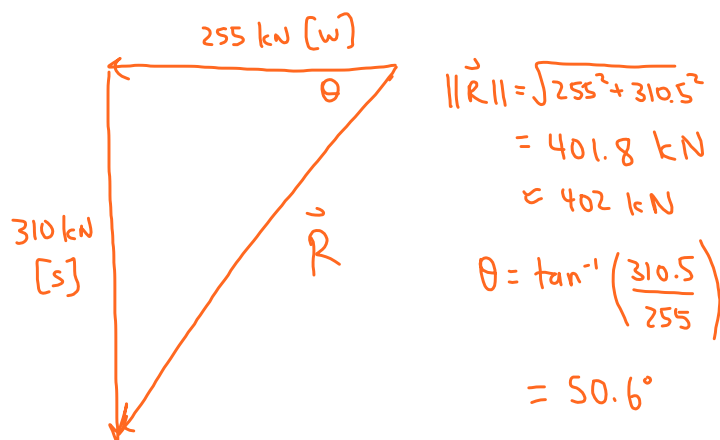
$\vec{N} = 325 \text{ kN [W}30^\circ\text{S]}$

determine the resultant of $\vec{M} + \vec{N}$.





$\vec{R} = (26 - 281, -148 - 162.5)$
 $= (-255, -310.5)$



$\vec{R} = 402 \text{ kN [W } 51^\circ \text{ S]}$