

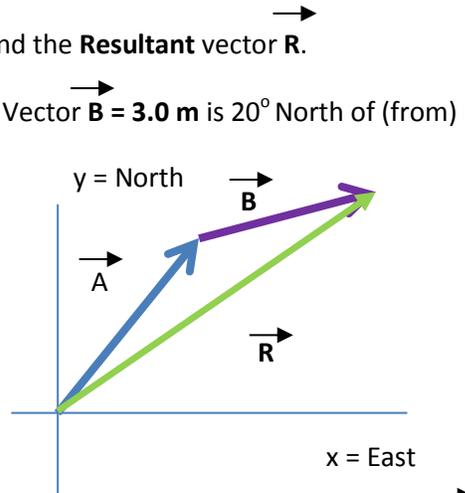
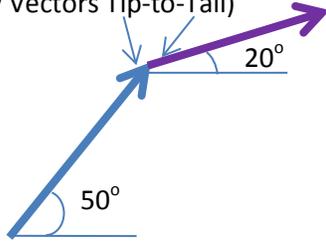
Vector Addition Example 1

Given: Two or more **vectors** to be added together to find the **Resultant** vector **R**.

Example: Vector **A = 5.0 m** is 50° North of (from) East. Vector **B = 3.0 m** is 20° North of (from) East

1) Draw Rough **Graphical Sketch**

(Draw Vectors Tip-to-Tail)



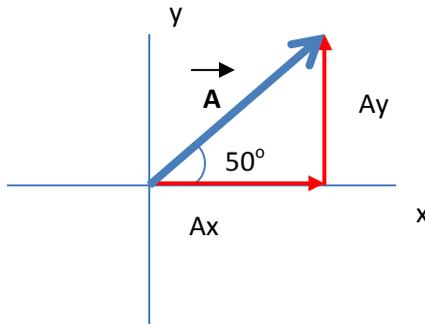
Need to find vector components for **A** and **B** and add them to get resultant components for **R**.

2) Draw a x-y coordinate system

3) Draw first vector starting from the origin and find components A_x and A_y . (Remember SOH CAH TOA)

$$\sin 50^\circ = \frac{A_y}{A}$$

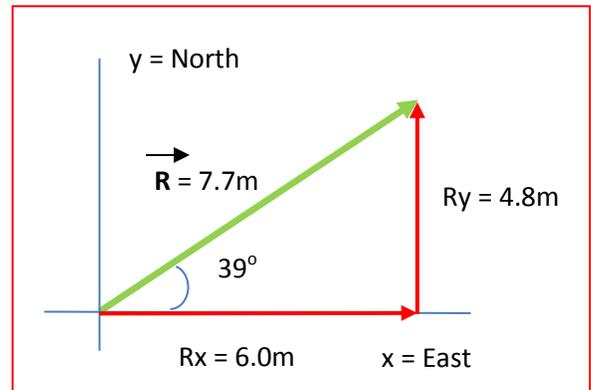
$$\cos 50^\circ = \frac{A_x}{A}$$



$$A_x = (\cos 50^\circ)(A) \quad A_x = (.643)(5m) \quad A_x = 3.2m$$

$$A_y = (\sin 50^\circ)(A) \quad A_y = (.766)(5m) \quad A_y = 3.8m$$

Answer: Below

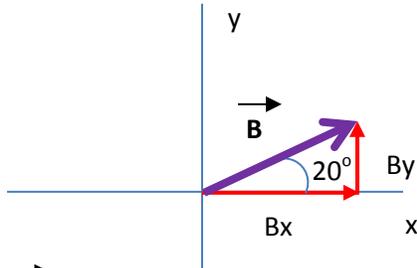


4) Draw "another" x-y coordinate system.

5) Draw second vector starting from the origin and find components. 6) Draw table and **ADD** components.

$$\sin 20^\circ = \frac{B_y}{B}$$

$$\cos 20^\circ = \frac{B_x}{B}$$



$$B_x = (\cos 20^\circ)(B) \quad B_x = (.940)(3m) \quad B_x = 2.8m$$

$$B_y = (\sin 20^\circ)(B) \quad B_y = (.352)(3m) \quad B_y = 1.0m$$

Vector	x component	y component
\vec{A}	$A_x = 3.2m$	$A_y = 3.8m$
\vec{B}	$B_x = 2.8m$	$B_y = 1.0m$
\vec{R}	$R_x = 6.0m$	$R_y = 4.8m$

$$R^2 = R_x^2 + R_y^2$$

$$R = \sqrt{(6.0 * 6.0) + (4.8 * 4.8)} = 7.7m$$

$$\text{Angle} = \tan^{-1}(|R_y|/|R_x|) = 39^\circ \text{ North of East}$$