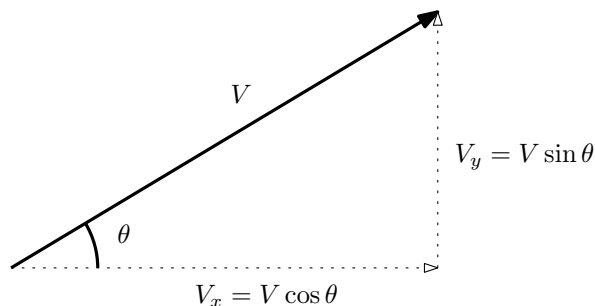
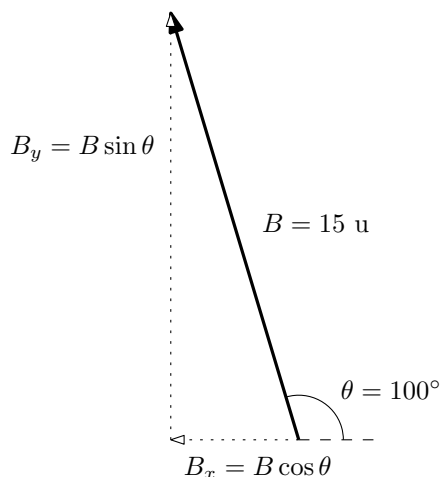
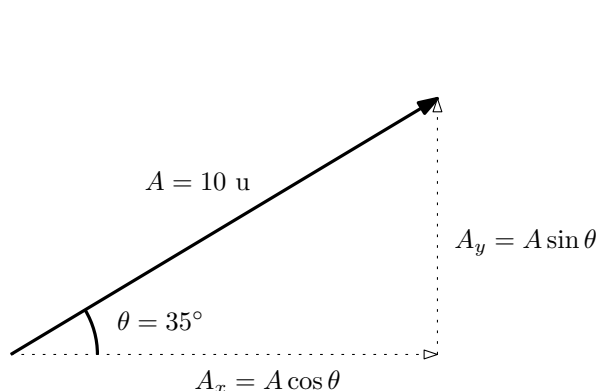


To add vectors, we must break them up into  $x$  and  $y$  components. Every vector with an angle  $\theta$  measured from the positive  $x$  axis can be decomposed into  $x$  and  $y$  components with sine and cosine.



For example, to add  $A = (10 \text{ u}, 35^\circ)$  and  $B = (15 \text{ u}, 100^\circ)$ , first find the  $x$  and  $y$  components of each:

$$\begin{aligned} A_x &= 8.19 \text{ u} & A_y &= 5.74 \text{ u} \\ B_x &= -2.60 \text{ u} & B_y &= 14.77 \text{ u} \end{aligned}$$



$$\begin{aligned} R_x &= A_x + B_x = 5.59 \text{ u} \\ R_y &= A_y + B_y = 20.51 \text{ u} \\ R &= \sqrt{(R_x)^2 + (R_y)^2} = 21.26 \text{ u} \\ \theta &= \tan^{-1}\left(\frac{R_y}{R_x}\right) = 74.75^\circ \end{aligned}$$

The magnitude of the resultant vector,  $R$ , is found by adding components and using the pythagorean theorem. The angle is found by using inverse tangent.

Try adding  $A = (5 \text{ u}, 25^\circ)$  and  $B = (7 \text{ u}, 75^\circ)$

[Ans:  $A + B = (10.90 \text{ u}, 54.44^\circ =)$ ]