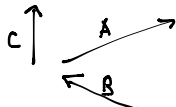
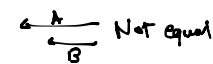
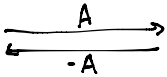


Vector

 Magnitude: length
 Direction

Equality
 Same magnitude
 Same direction
 Not equal

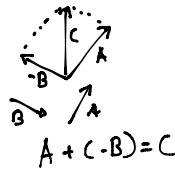
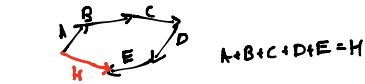
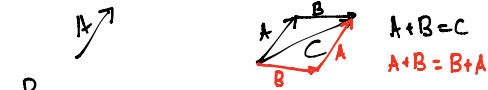
Negative Vector
 Same magnitude
 Opposite direction



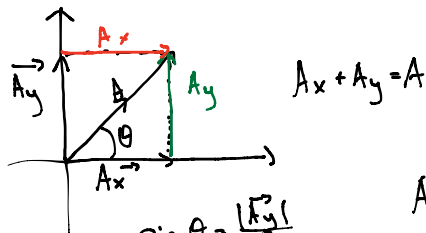
Scalar Product
 Vector · Vector = Scalar
 Work / Energy

Vector (cross) product
 $A \cdot B = C$
 Vector · Vector = Vector
 TORQUE

Add Tip to tail



Scalar
 $2 = 2$
 $2 + 3 = 5$
 $2 + 3 = 3 + 2$
 -2
 $5 - 2 = 3$
 $5 + (-2) = 3$



$$\sin \theta = \frac{|A_y|}{|A|}$$

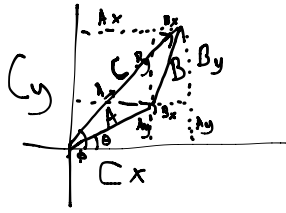
$$\cos \theta = \frac{|A_x|}{|A|}$$

$$\tan \theta = \frac{|A_y|}{|A_x|}$$

$$A = \sqrt{A_x^2 + A_y^2}$$

$A_x = x$ component of \vec{A}
 $A_y = y$ " " "

Important



Find $\Rightarrow C, \psi$

Solve

$$\begin{aligned} A &= 60 \text{ m} & A_x &= 60 \cos 30^\circ = 52.0 \text{ m} \\ \theta &= 30^\circ & A_y &= 60 \sin 30^\circ = 30.0 \text{ m} \\ B &= 30 \text{ m} & B_x &= 30 \cos 60^\circ = 15.0 \text{ m} \\ \phi &= 60^\circ & B_y &= 30 \sin 60^\circ = 26.0 \text{ m} \end{aligned}$$

$$\begin{aligned} C_x &= A_x + B_x \\ &= 52 + 15 \\ &= 67.0 \text{ m} \end{aligned}$$

$$\begin{aligned} C_y &= A_y + B_y \\ &= 30 + 26 \\ &= 56.0 \text{ m} \end{aligned}$$

$$\begin{aligned} C &= \sqrt{C_x^2 + C_y^2} \\ &= \sqrt{67^2 + 56^2} \\ &= 87.3 \text{ m} \end{aligned}$$

$$\sin \psi = \frac{C_y}{C}$$

$$\begin{aligned} \psi &= \sin^{-1} \left(\frac{56}{87.3} \right) \\ &= \boxed{39.9^\circ} \end{aligned}$$