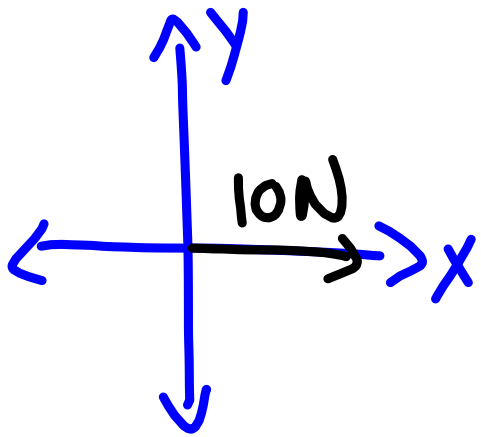
Vectors

- Direction and magnitude

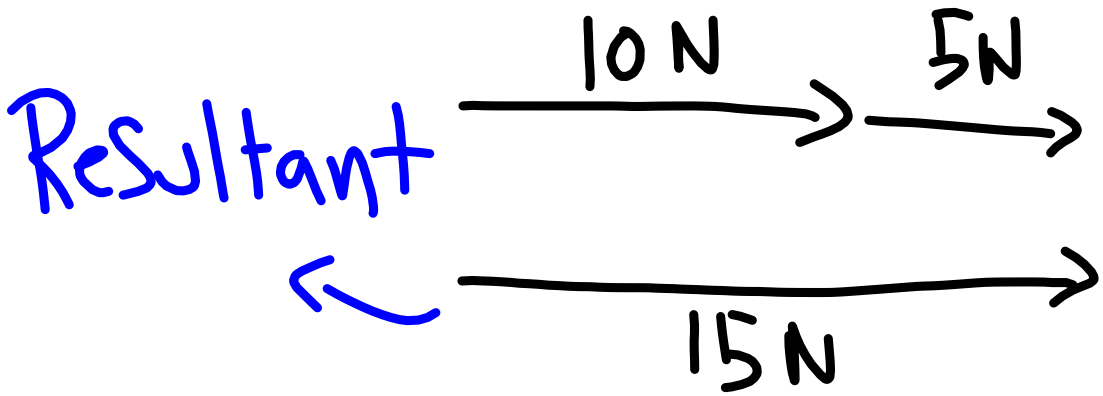
10 N

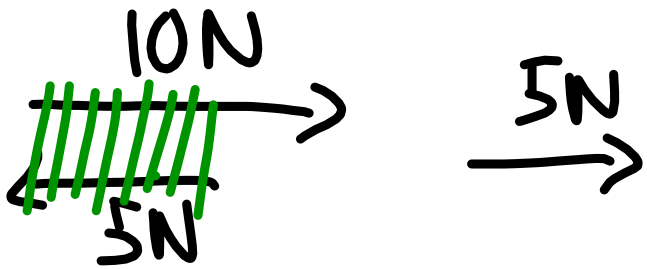


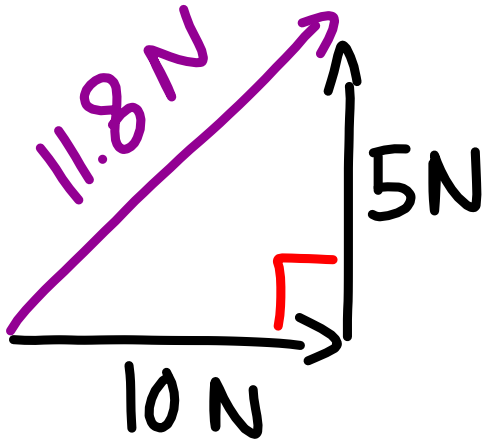
$(10\,N)\,\hat{i}$

ten N to the right

Addition: tip to tail

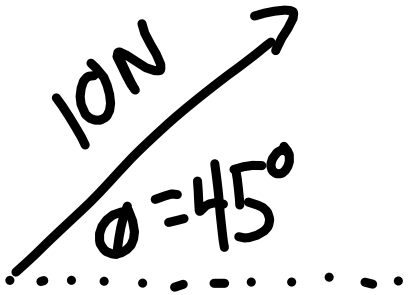


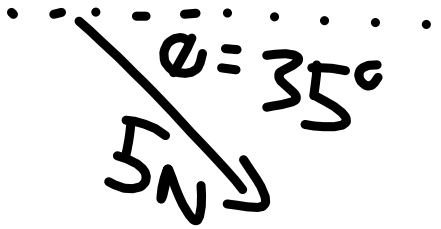


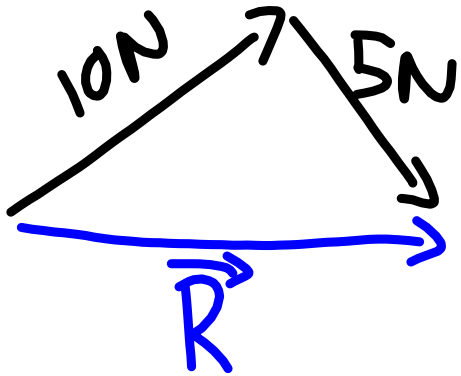

11.8 N
5N
10 N

If no right angles....

Break vectors into Components

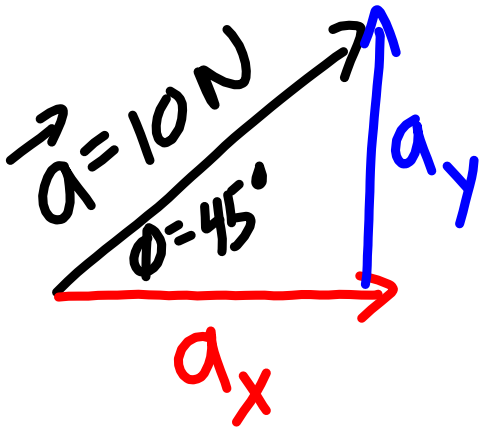






SOHCAHTOA

↳ $\sin\theta = \frac{O}{H}$



a_x

$\cos\theta = \frac{A}{H}$

$\cos(45°) = \frac{a_x}{10}$

$a_x = \cos(45°)10 = 7.071$

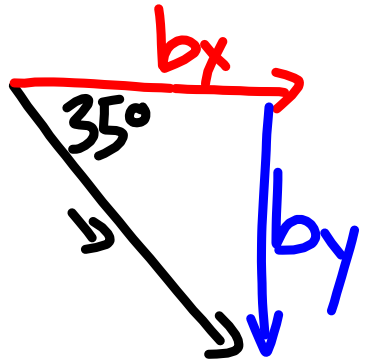
1 a_y

$\sin\theta = \frac{O}{H}$

$\sin(45°) = \frac{a_y}{10}$

$\sin(45°)10 = a_y = 7.071$

$\vec{b} = 5N$ ⇝



b_x

$5\cos(35°) = b_x$

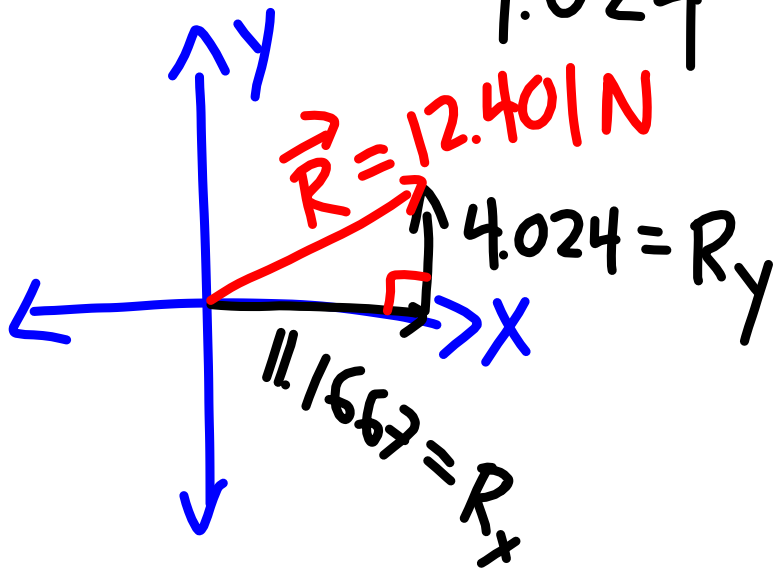
$b_x = 4.095$

b_y

$5\sin(35°) = b_y$

$b_y = -2.867$

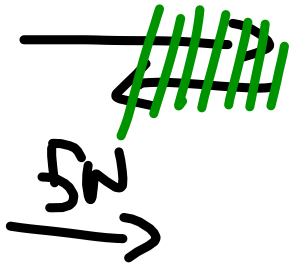
X	Y
$a_x = 7.071$	$a_y = 7.071$
$+ \; b_x = 4.095$	$+ \; b_y = -2.867$
11.1667	4.024



Subtraction → Add the inverse

10 N − 5 N

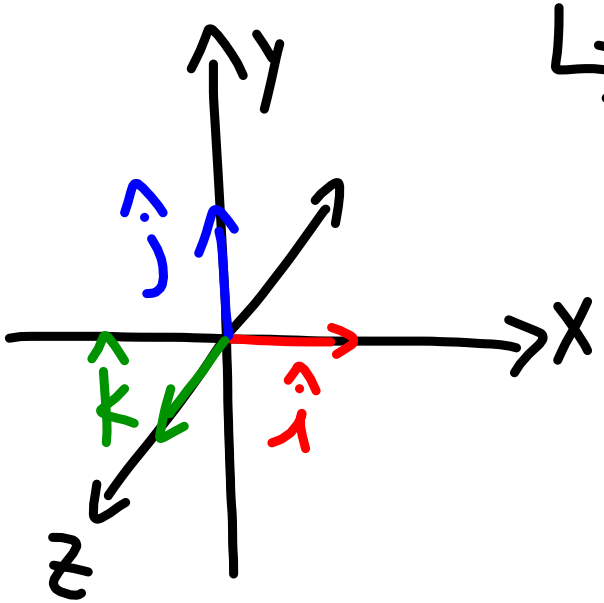
10 N + 5 N



Component Notation

use unit vectors

↳ magnitude = 1



ex:

$$\vec{A} = (A_x)\hat{i} + (A_y)\hat{j} + (A_z)\hat{k}$$