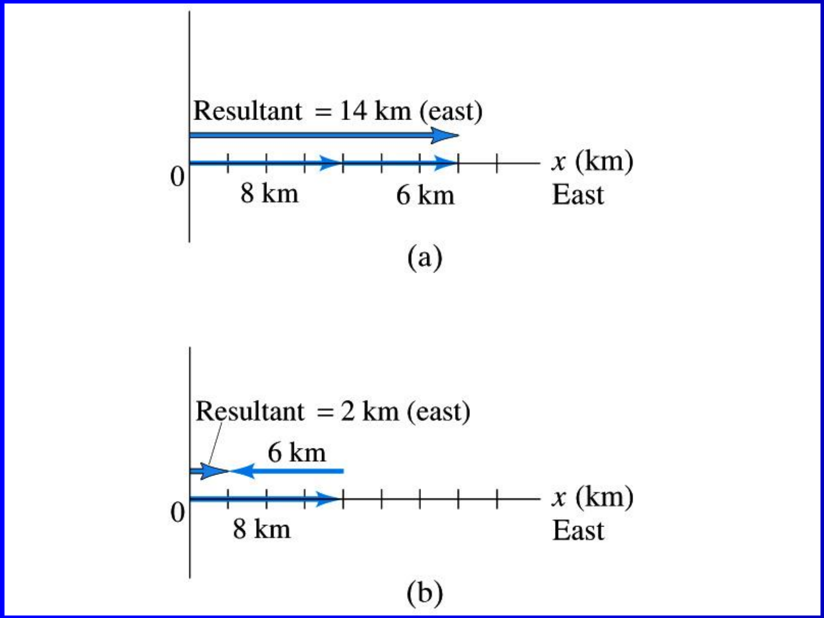
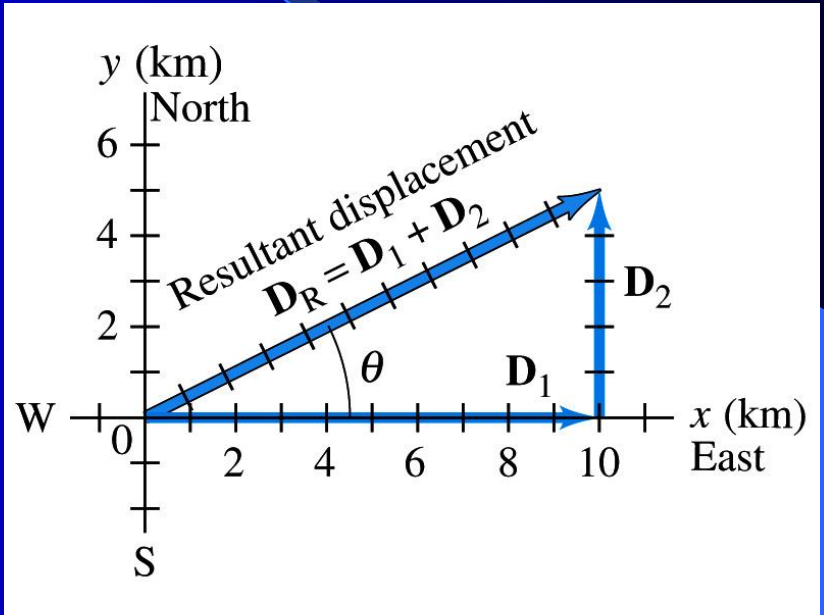
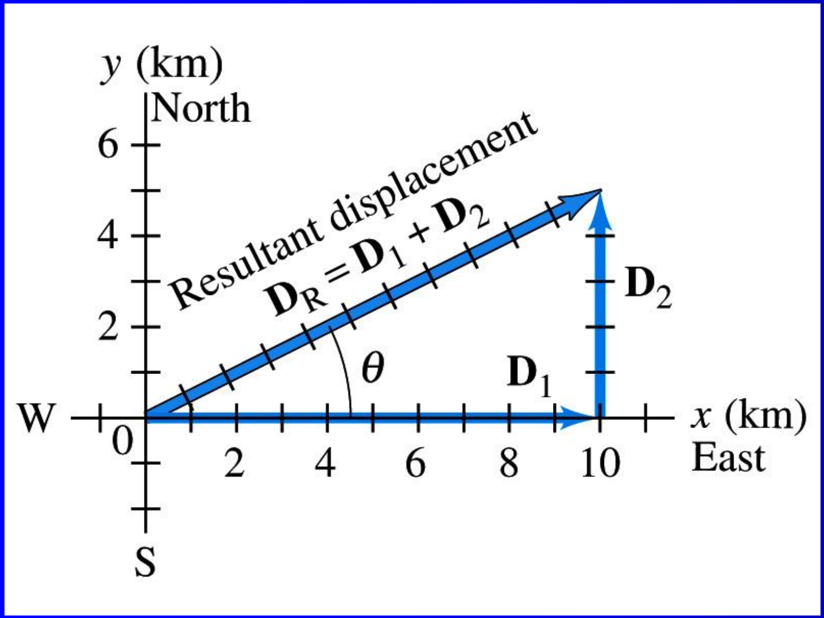
Vectors

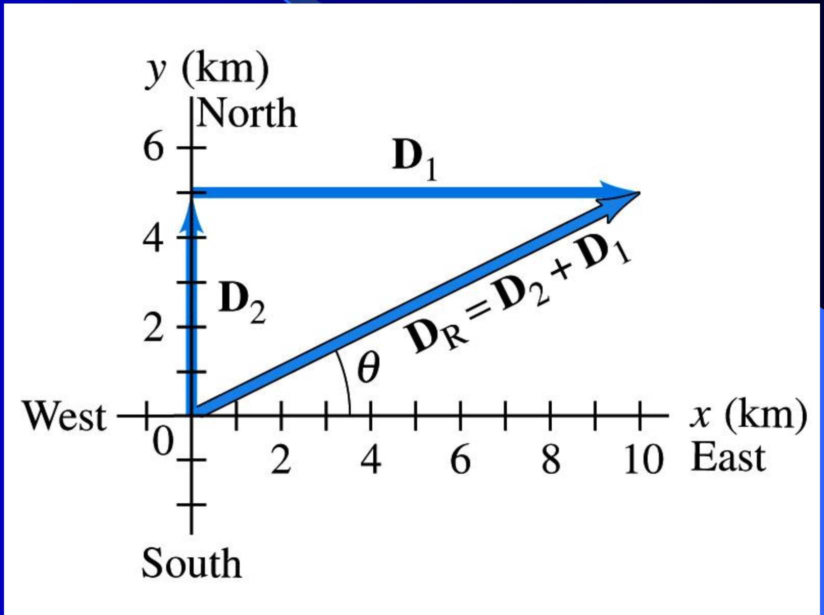




How to add two vectors?

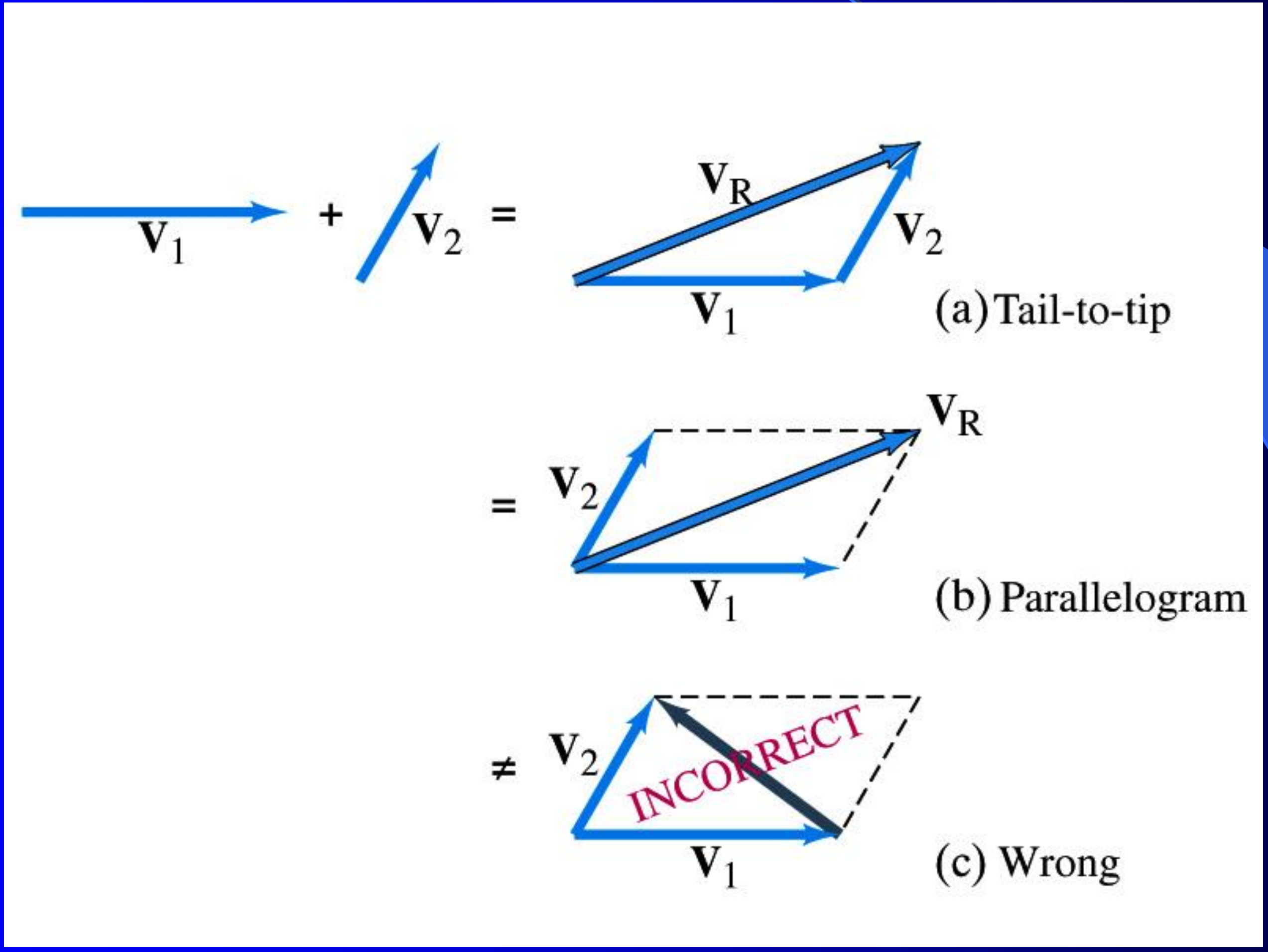
Commutative Law



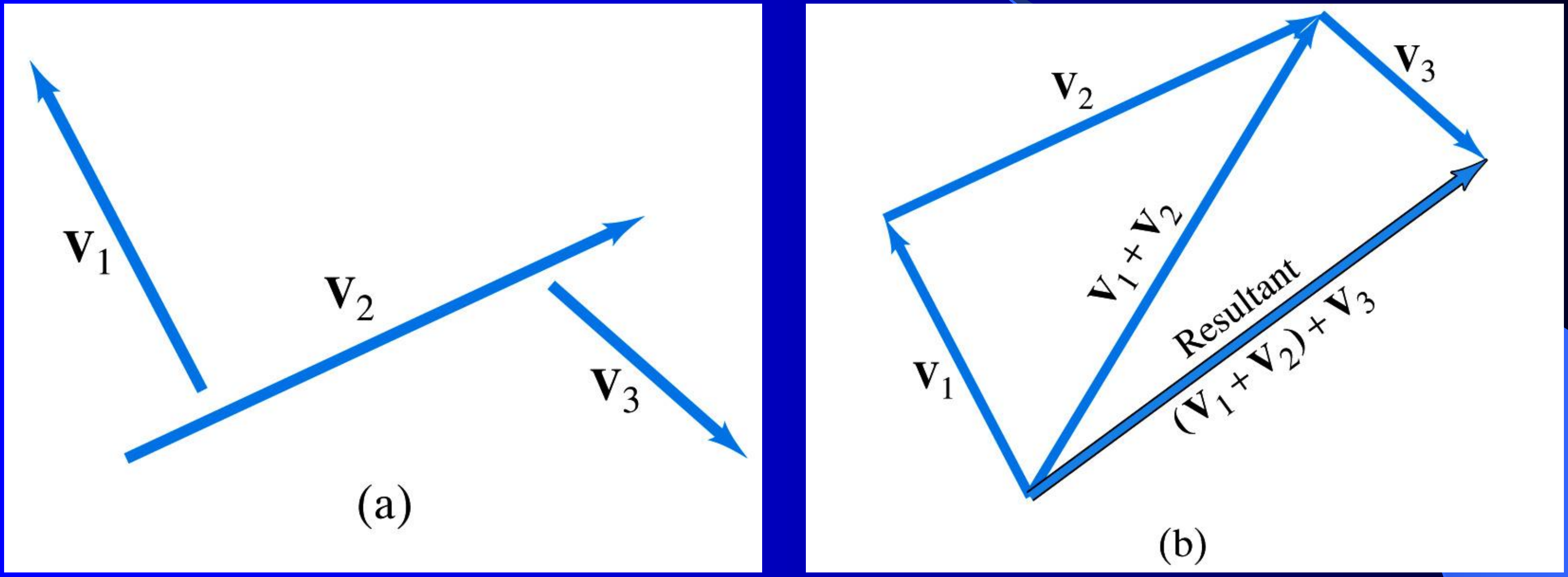


The order of how you add 2 vectors does not matter!

Another way to add vectors



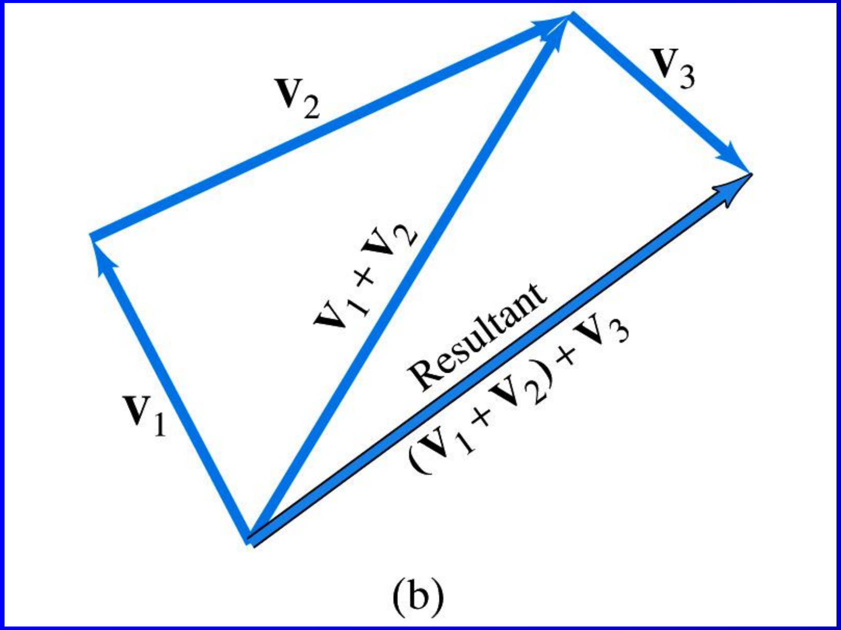
Associative Law

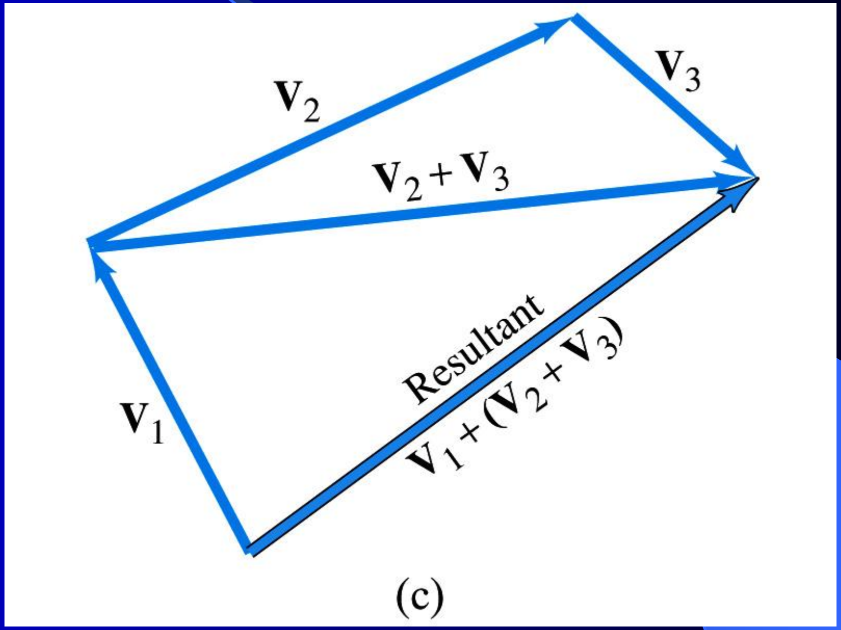


Add vectors tail to tip

Does the order of additions matter?

Associative Law

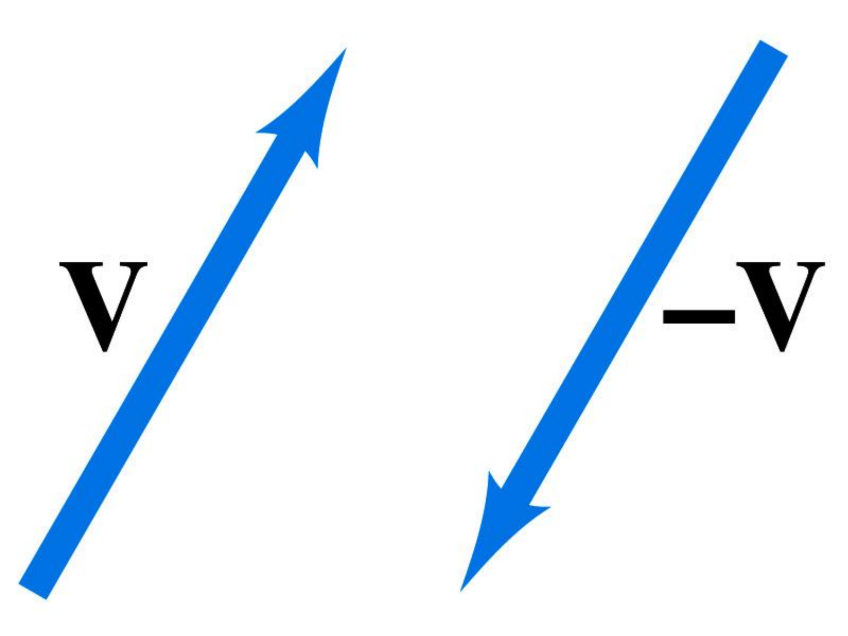


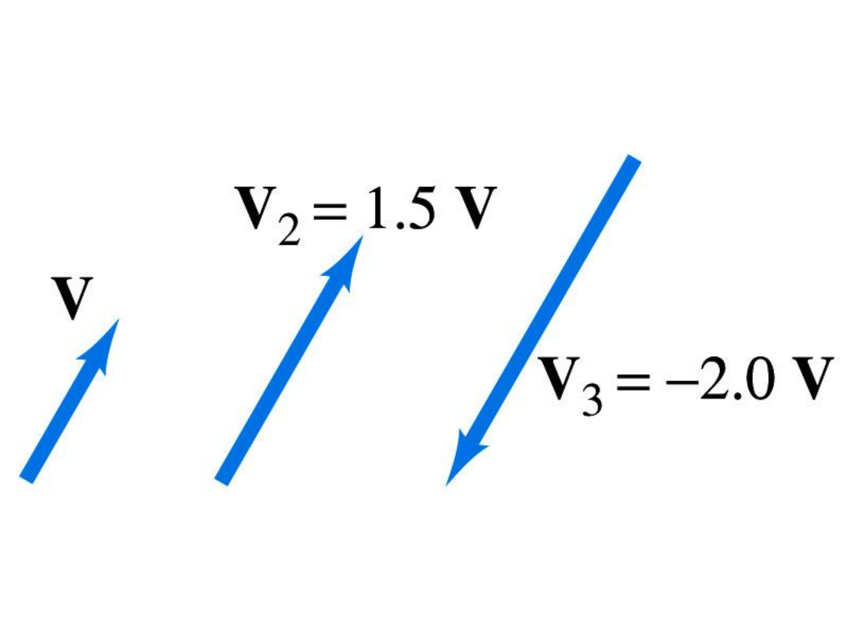


Add vectors tail to tip

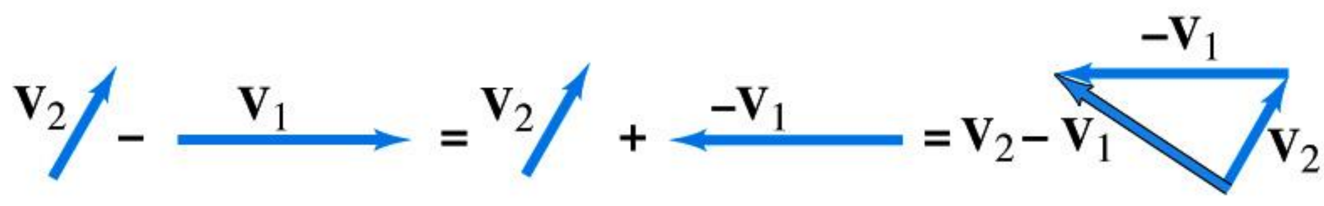
Does the order of additions matter? NO!

Multiples of a Vectors

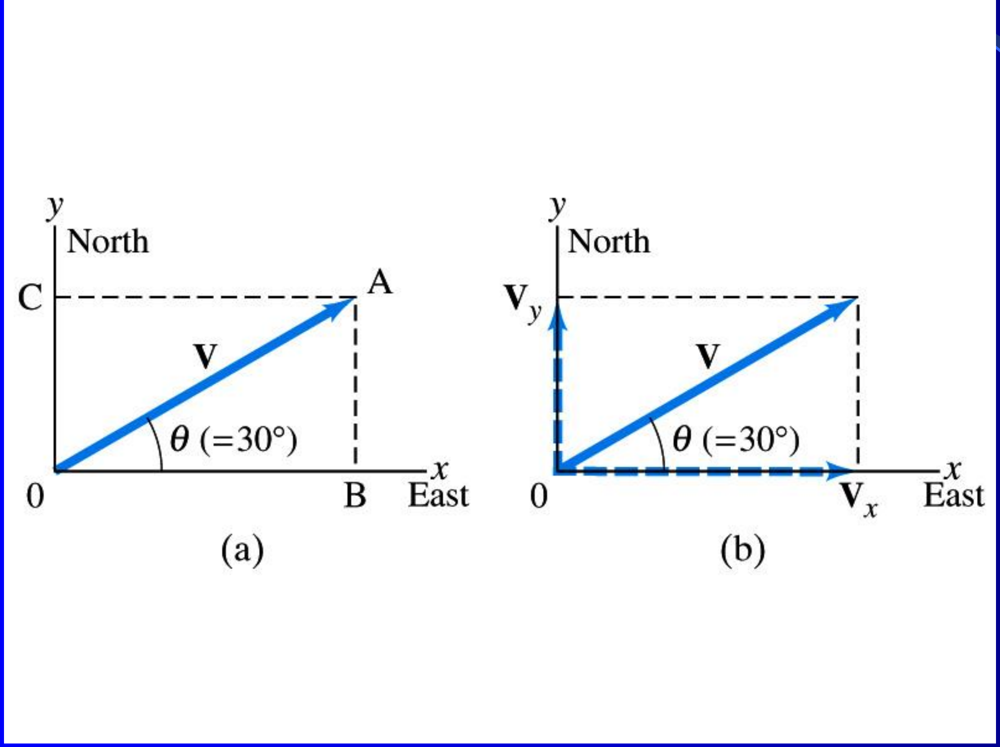




Subtracting a Vectors



And now: the math



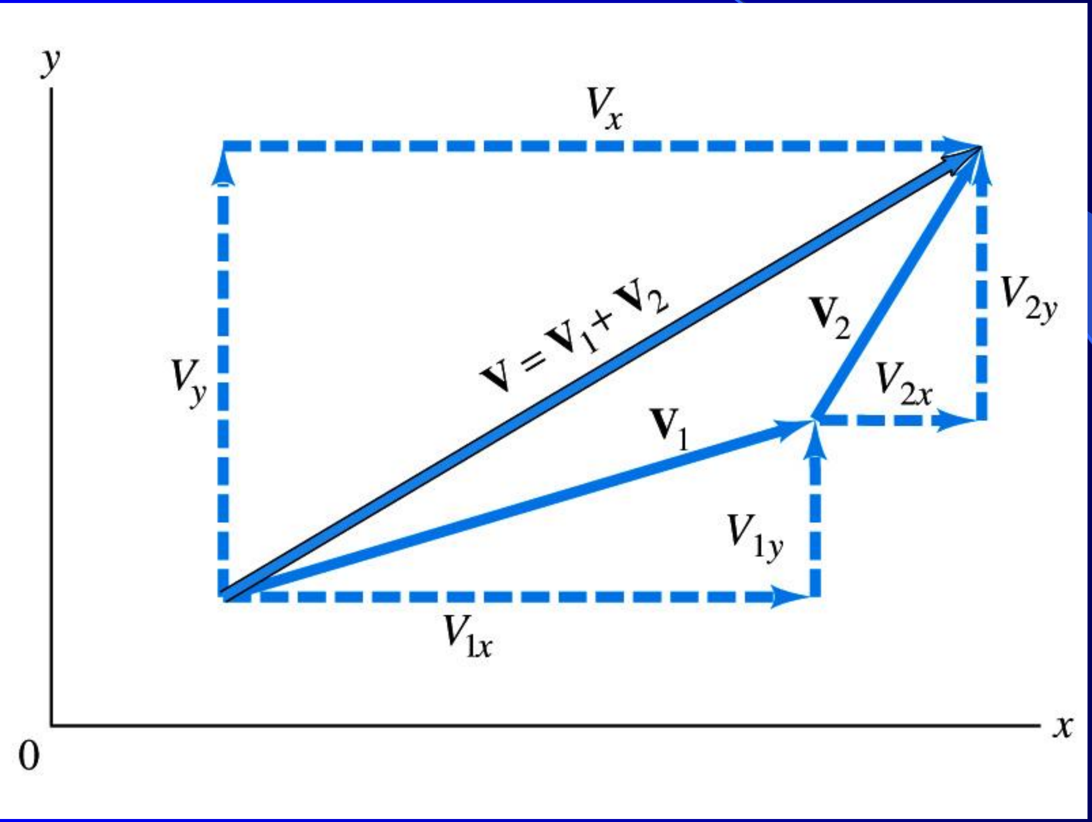
$\mathbf{V}=(V_x, V_y)$

Vector components in coordinate system

$V_x=V\cos\theta$ $V_y=V\sin\theta$

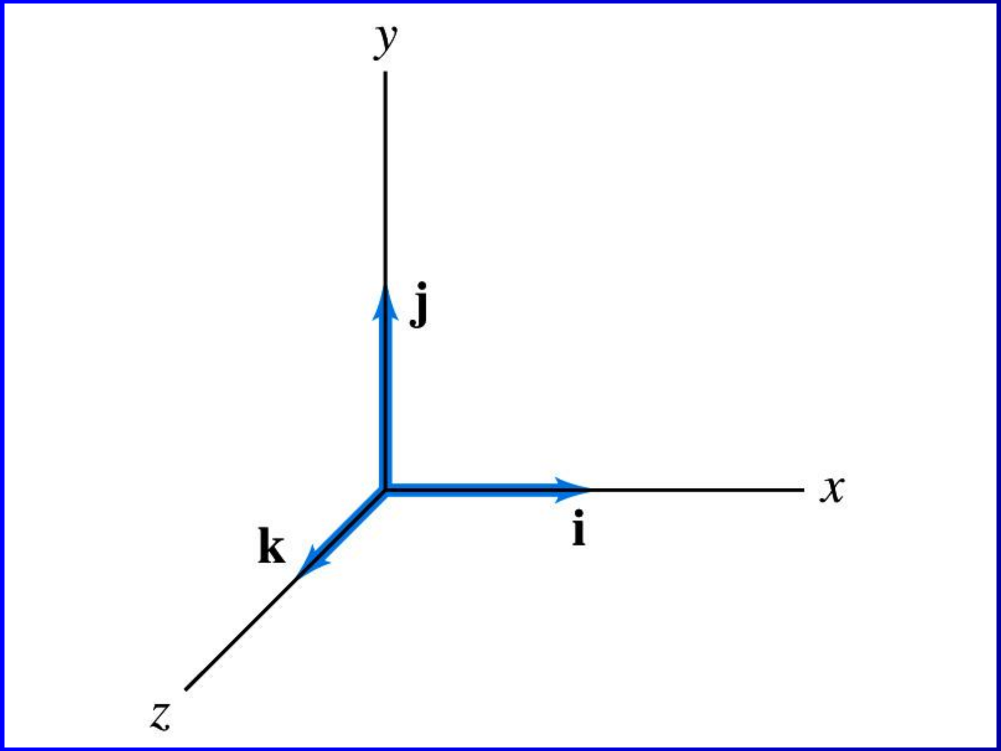
$V^2=V_x^2+V_y^2$ $\tan\theta=V_x/V_y$

And now: the math



$$\mathbf{V} = \mathbf{V_1} + \mathbf{V_2} = (V_{1x} + V_{2x}, V_{1y} + V_{2y})$$

Unit vectors



$$\mathbf{V} = (V_x)\,\mathbf{i} + (V_y)\,\mathbf{j}$$
$$= \mathbf{V_1} + \mathbf{V_2}$$
$$= (V_{1x}\,\mathbf{i} + V_{1y}\,\mathbf{j}) + (V_{2x}\,\mathbf{i} + V_{2y}\,\mathbf{j})$$
$$= (V_{1x} + V_{2x})\,\mathbf{i} + (V_{1y} + V_{2y})\,\mathbf{j}$$

$$\mathbf{V} = V_x\,\mathbf{i} + V_y\,\mathbf{j} + V_z\,\mathbf{k}$$