NOTES: Vector review

Scalar SIGNED QUANTITY

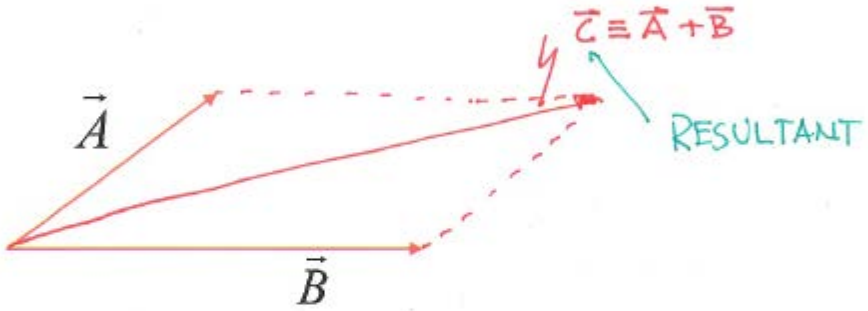
e.g., mass, temperature, energy

Vector "MAGNITUDE & DIRECTION" NOTATION $\vec{V}, \vec{F}$ etc.

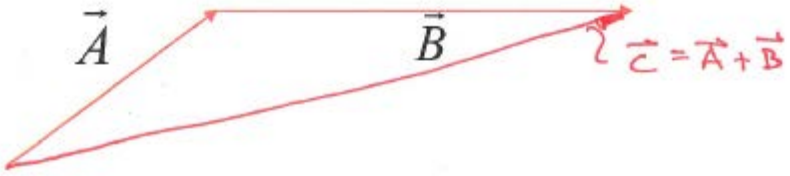
e.g. FORCE, VELOCITY, MOMENT

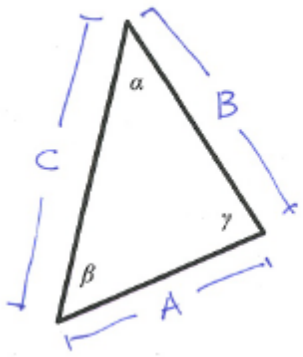
Vectors operations

Vector addition obeys THE PARALLELOGRAM LAW



or TAIL **to** TIP





Useful tools

Law of sines

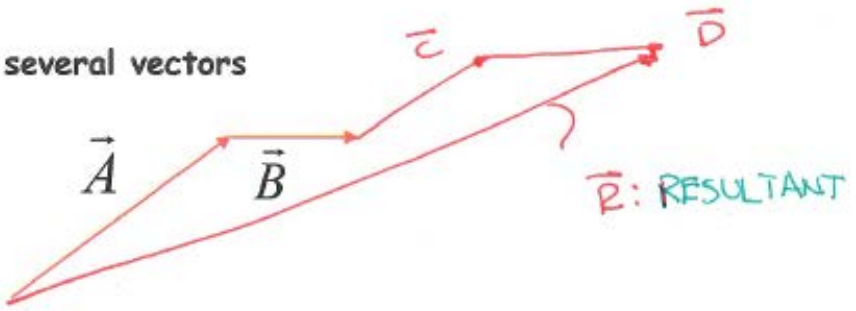
$$\frac{A}{\sin\alpha} = \frac{B}{\sin\beta} = \frac{C}{\sin\gamma}$$

Law of cosines

$$C^2 = A^2 + B^2 - 2AB\cos\gamma$$

NOTES: Vector review

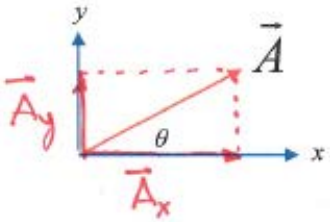
Adding several vectors



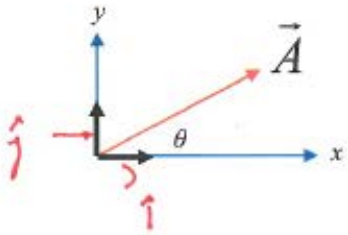
Commutative: $\vec{A} + \vec{B} = \vec{B} + \vec{A}$

Associative: $(\vec{A} + \vec{B}) + \vec{C} = \vec{A} + (\vec{B} + \vec{C})$

$\vec{A} = \vec{A}_x + \vec{A}_y \qquad |\vec{A}|^2 = |\vec{A}_x|^2 + |\vec{A}_y|^2$



Unit vectors — PURE DIRECTION; "MAGNITUDE" of 1, BUT NO DIMENSIONS



SO: $\vec{A} = A_x \hat{i} + A_y \hat{j}$

If |A| = 5 N and θ = 30°, write in component form

$\vec{A} =$ $A\cos\theta\,\hat{i} + A\sin\theta\,\hat{j} = 4.33\,\hat{i} + 2.50\,\hat{j}$ N

Vector addition works COMPONENTWISE.