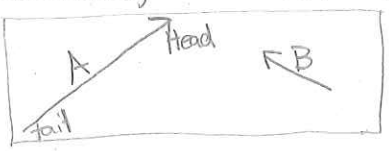
Topic 1B: Distance (Scalar) and Displacement (Vector) Intro to Vector and Scalar (CON'T)

Skill 7: Head to Tail and Tail to Tail Addition of Vectors

In both methods – draw each arrow to scale and with direction (angle) relative to 0°

Head to tail (used for 2 or more vectors)



order not important

start each new vector at end of prior (keeping magnitude & direction)

Resultant is from tail of 1st to head of last

Tail to Tail (Parallelogram) used for 2 vectors

Create a Parallelogram by making a copy of each vector (keeping length/magnitude & direction)

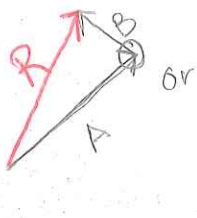
For either system use logic of the parts

A is to the right & up

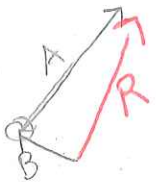
B is a little left a little up.

R is the combo of the 2 so it is more upward than A & less right

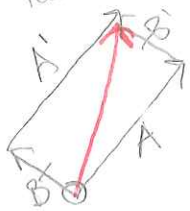
Head to tail



or



Tail to Tail

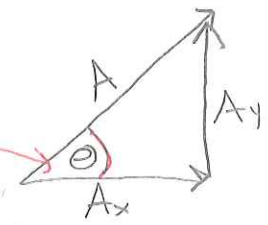


Skill 8: Vector Equation

Vector equations can be used to combine two perpendicular vectors (horizontal = x & vertical = y) to Find a resultant OR to break down a single vector into "x" & "y" components

Assumptions for using equations

- Must be a right triangle where the angle is drawn between the horizontal (A_x or adj) and the resultant (A or hyp).



A = resultant (hyp)

A_x = horizontal (adj)

A_y = vertical (opp)

So $\sin\theta = \frac{opp}{hyp}$ becomes $\sin\theta = \frac{A_y}{A}$ or $\boxed{A_y = A\sin\theta}$ $\theta = \sin^{-1}\left(\frac{A_y}{A}\right)$

$\cos\theta = \frac{adj}{hyp}$ becomes $\cos\theta = \frac{A_x}{A}$ or $\boxed{A_x = A\cos\theta}$ $\theta = \cos^{-1}\left(\frac{A_x}{A}\right)$

$\tan\theta = \frac{opp}{adj}$ becomes $\tan\theta = \frac{A_y}{A_x}$ or $\boxed{\theta = \tan^{-1}\left(\frac{A_y}{A_x}\right)}$ $A_y = A_x\tan\theta$