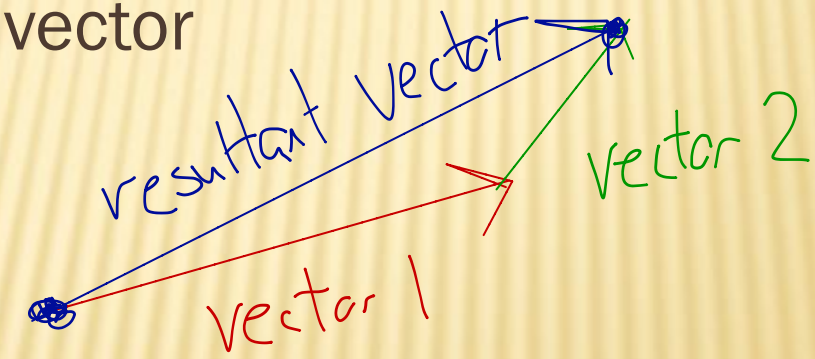
RESULTANT VECTOR

- Resultant Vector:
  - A vector that results from adding two or more given vectors
  - Add vectors from the tail of the first vector to the tip of the final vector



ADDING VECTORS A GRAPHICAL APPROACH

- Choose a suitable scale to represent the vectors (ex. 1cm to 100m)
- Use a protactor to measure angles

- Copy or Print from website
- Watch 2 or 3 videos on Vectors that will be on website.

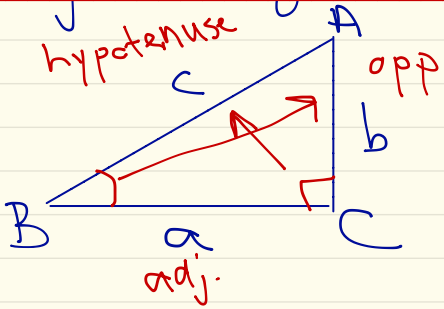
ADDING VECTORS AN ALGEBRAIC APPROACH

- Perpendicular vectors can be added algebraically using the Pythagorean theorem and the tangent function
- By using the component method of vector addition, all vector addition problems can be converted into a problem involving two perpendicular vectors

COMPONENT VECTOR

- The x-vector or the y-vector that can be broken down into an overall vector

Right Triangle Trigonometry



SOH CAH TOA

Pyth. Theorem

$a^2 + b^2 = c^2$

$c^2 - b^2 = a^2$

$c^2 - a^2 = b^2$

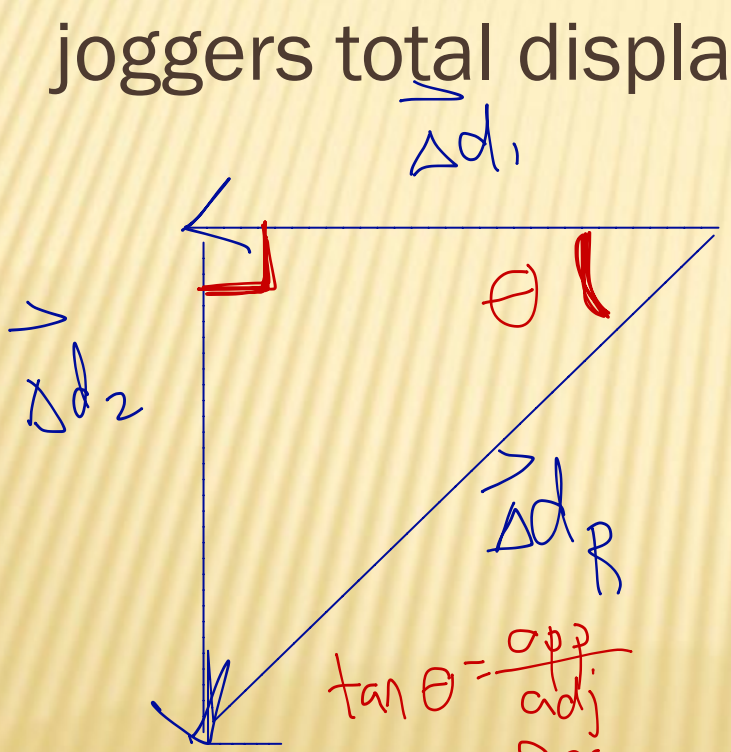
$\sin A = \frac{opp}{hyp}$

$\cos A = \frac{adj}{hyp}$

$\tan A = \frac{opp}{adj}$

ADDING TWO PERPENDICULAR VECTORS USING ALGEBRA

- A jogger runs 400.0 m [W], turns and continues for an additional 900.0 m [S]. Determine the joggers total displacement.



$|\vec{\Delta d}_R|$

$c^2 = a^2 + b^2$

$c = \sqrt{a^2 + b^2}$

$= \sqrt{(\vec{\Delta d}_1)^2 + (\vec{\Delta d}_2)^2}$

$= \sqrt{(400)^2 + (900)^2}$

$= \sqrt{970\,000}$

magnitude of displacement. $|\vec{\Delta d}_R| = 984.9\text{ m}$

$\tan\theta = \frac{\text{opp}}{\text{adj}}$

$\tan\theta = \frac{900}{400}$

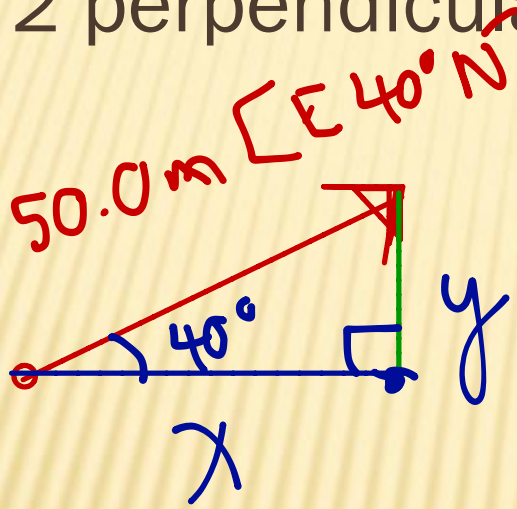
$\theta = \tan^{-1}\left(\frac{900}{400}\right)$

$\theta = 66^\circ$

$\therefore \vec{\Delta d}_R = 980\text{ m}\ [W\ 66^\circ S]$

BREAKING DOWN VECTORS INTO TWO PERPENDICULAR COMPONENTS

- Break the displacement vector 50.0 m [E40^{0}N] into 2 perpendicular component vectors.



SOH CAH TOA

y component

$\sin 40^\circ = \frac{y}{50}$

$y = 50 \sin 40^\circ$

$y = 32\ m$

$\therefore \Delta d_y = 32\ m\ [N]$

x component

$\cos 40^\circ = \frac{x}{50}$

$x = 50 \cos 40^\circ$

$x = 38\ m$ $\therefore \Delta d_x = 38\ m\ [E]$

WORK FOR THE DAY

- Pg. 65 #1,2,4,5
- Pg. 67 #1,2
- Pg. 69 #1,2

+ watch the videos on website.

+ note for tomorrow.