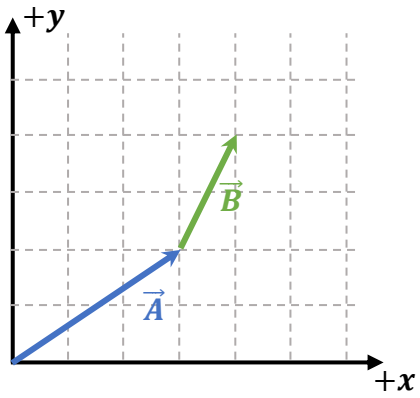
CONCEPT: VECTOR ADDITION BY COMPONENTS

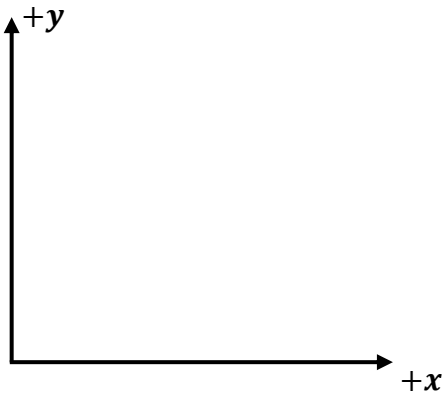
- You'll need to add vectors together and calculate the magnitude & direction of the resultant *without* counting squares.

EXAMPLE: You walk 5m at 53° above the +x-axis, then 8m at 30° above the +x-axis. Calculate the magnitude & direction of your total displacement.

ADDING VECTORS GRAPHICALLY (WITH SQUARES)



ADDING VECTORS BY COMPONENTS (WITHOUT SQUARES)



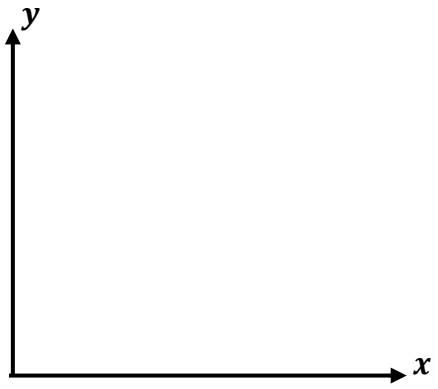
	x	y
$\vec{A}$		
$\vec{B}$		
$\vec{R} =$ _____		

VECTOR ADDITION

1) Draw & connect vectors tip-to-tail
2) Draw Resultant & components
3) Calculate ALL X&Y components
4) Combine X & Y components according to R equation
5) Calculate R and θ_R

Vector Composition (Components→Vector)	Vector Decomposition (Vector→Components)
$R = \sqrt{R_x^2 + R_y^2}$ $\theta_X = \tan^{-1}\left(\frac{R_y}{R_x}\right)$	$A_x = A\cos(\theta_X)$ $A_y = A\sin(\theta_X)$

EXAMPLE: Vector $\vec{A}$ has a magnitude of 10m at a direction 40° above the +x-axis. $\vec{B}$ has magnitude 3 at a direction 20° above the x-axis. Calculate the magnitude and direction of $\vec{R} = \vec{A} - 2\vec{B}$.



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