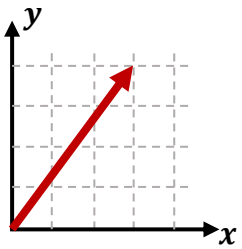
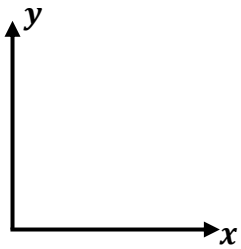
CONCEPT: VECTOR COMPOSITION AND DECOMPOSITION

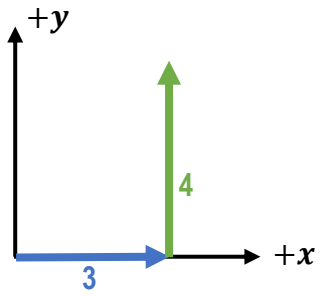
- You'll need to do vector math ***without*** using grids/ squares.
  - Vectors have **magnitude** (length), **direction** (angle $\boldsymbol{\theta_x}$), and **components** (legs).





VECTOR COMPOSITION

1D Components → 2D Vector (Magnitude & Direction)

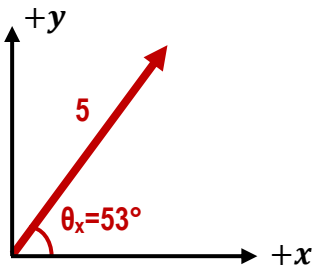


- Components A_x & A_y combine → magnitude $\vec{A}$
  - Points in direction $\boldsymbol{\theta_x}$

VECTOR COMPOSITION
$A = \sqrt{A_x^2 + A_y^2}$
$\theta_x =$ _____

VECTOR DECOMPOSITION

2D Vector (Magnitude & Direction) → 1D Components



- Use **SOH-CAH-TOA** to decompose $\vec{A}$ →components A_x & A_y.
  - Angle $\boldsymbol{\theta_x}$ *must* be drawn to nearest _____

VECTOR DECOMPOSITION
$A_x =$ _____
$A_y =$ _____

EXAMPLE: For each of the following, draw the vector and solve for the missing variable(s).

a) A_x = 8m, A_y = 6m, $\boldsymbol{A}$ = ? $\boldsymbol{\theta_x}$ = ?

b) B = 13m, $\boldsymbol{\theta_x}$ = 67.4°, B_x = ? B_y = ?

EXAMPLE**:** A vector **A** has y-component of 12 m makes an angle of 67.4° with the positive x-axis**. (a)** Find the magnitude of **A. (b)** Find the x-component of the vector**.**

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