

Write the ordered pair that represents the vector from $A(3, -1)$ to $B(-4, 0)$.
Then find the magnitude of \vec{AB} .

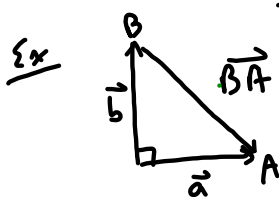
$$\vec{AB} = \langle -4 - 3, 0 - (-1) \rangle$$

$$\langle -7, 1 \rangle$$

$$\begin{aligned} |\vec{AB}| &= \sqrt{(-4-3)^2 + (0-(-1))^2} \\ &= \sqrt{49+1} = \sqrt{50} = \sqrt{2} \cdot \sqrt{25} \\ &= 5\sqrt{2} \end{aligned}$$

8-5 Applications w/ Vectors

Torque - Measure of force in turning an object about a pivot pt.



$\vec{a}, \vec{b}, \vec{BA}$ all satisfy the Pythagorean theorem
 $\therefore |\vec{BA}|^2 = |\vec{a}|^2 + |\vec{b}|^2$

Ex Lenny exerts a force of 180 lbs due N
Steve " " 125 lbs due E

Det. the resultant force exerted on the object.

$$|\vec{F}|^2 = |180|^2 + |125|^2$$

$$|\vec{F}| \approx 219 \text{ lbs}$$

To determine the θ the resultant force makes w/ the horizontal.

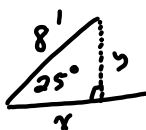
$$\tan \theta = \frac{y}{x} \rightarrow \tan^{-1}\left(\frac{y}{x}\right) = \theta$$

$$\tan^{-1}\left(\frac{180}{125}\right) = \theta$$

$$55.2^\circ \approx \theta$$

What if we don't have a \perp vector?

Ex Cart is pushed up a 25° ramp that is 8' long.



SOH CAH TOA
Horizontal

$$\cos 25^\circ = \frac{x}{8}$$

$$8 \cos 25 = x$$

$$x \approx 7.25$$

Vertical

$$\sin 25 = \frac{y}{8}$$

$$8 \sin 25 = y$$

$$y \approx 3.38$$