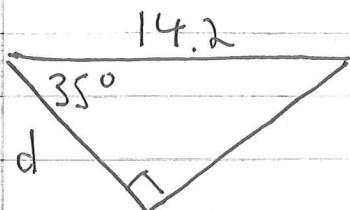


These are NOT notes. They are a visual aid(20%) for a verbal explanation(80%).

1

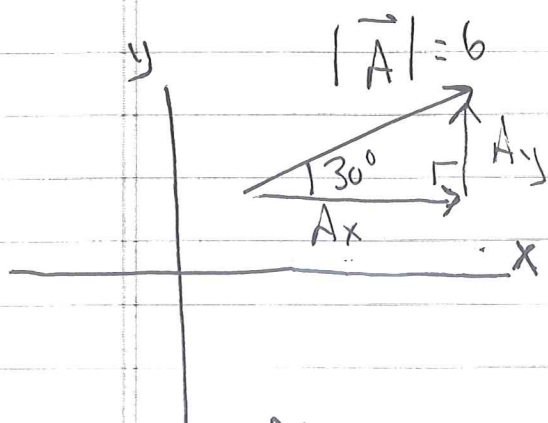
## Chapter 1



$$\cos(35) = \frac{d}{14.2}$$

$$d = 14.2 \cos(35) = \underline{\underline{11.6}}$$

units? ☺



$$A_x = |A| \cos(30) = 5.2$$

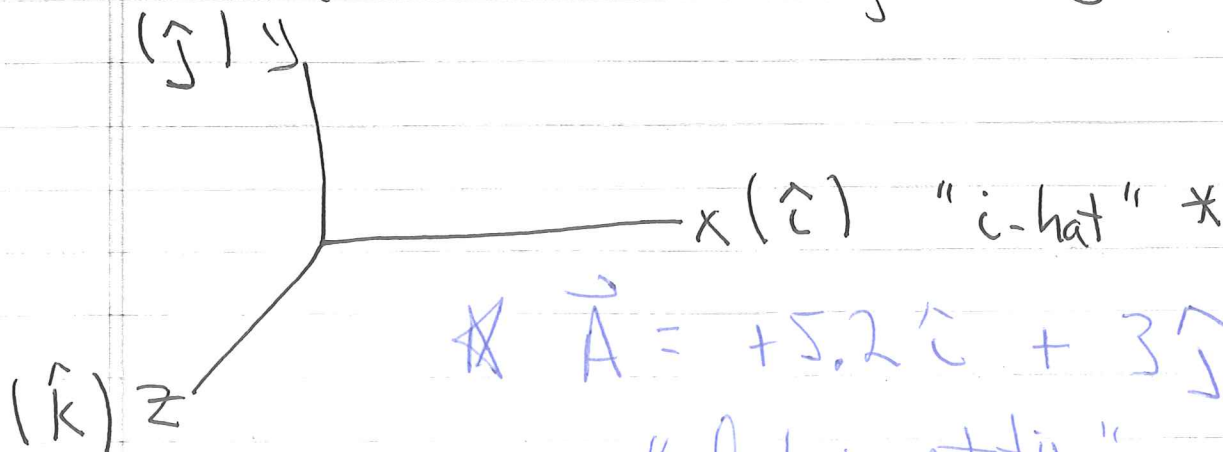
$$A_y = |A| \sin(30) = 3$$

$|A|$  "the magnitude of the vector  $\vec{A}$ "

$$|A| = \sqrt{A_x^2 + A_y^2} \quad \text{Pyth.}$$

Unit vectors that define a "standard" right hand coordinate system.

\* "unit vector"  $\rightarrow$  has a magnitude of 1



$$\vec{A} = +5.2 \hat{i} + 3 \hat{j}$$

"algebraic notation"

"the x component of  $\vec{A}$  is +5.2"

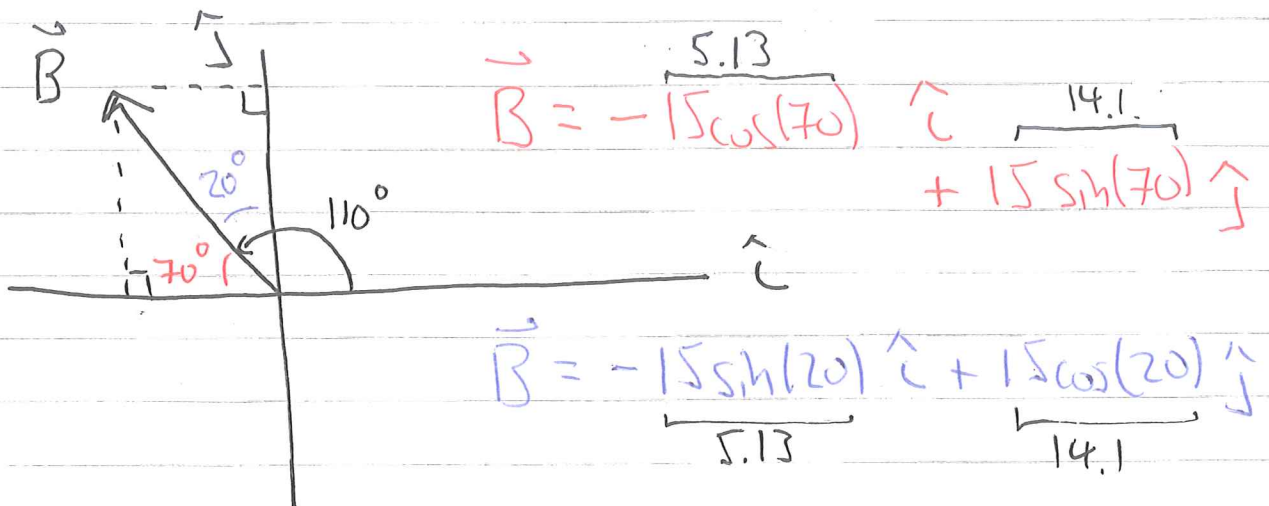
$A_x$

Instead of SOHICAH TOA ☹️

use :  $\left[ \begin{array}{l} \text{Opposite} \rightarrow \text{sine} \\ \text{Adjacent} \rightarrow \text{cosine} \end{array} \right]$

Ex:  $|\vec{B}| = 15$   $\vec{B}$  is @ an angle of  $+110^\circ$  ☺️

Write  $\vec{B}$  in terms of its vector components.



NOTE:  $B_x = 5.13$ ,  $B_y = 14.1$

$$\vec{B} = -B_x \hat{i} + B_y \hat{j}$$

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3

## Vector Algebra

Ex. 1  $\vec{A} = 5\hat{i} - 2\hat{j} + 3\hat{k}$

Find the magnitude of  $\vec{C}$  if  $\vec{C} = 5\vec{A}$ .

$$\vec{C} = 5 * (5\hat{i} - 2\hat{j} + 3\hat{k}) = 25\hat{i} - 10\hat{j} + 15\hat{k}$$

THOU SHALT NOT MIX X AND Y

3<sup>rd</sup> Pyth.  $|\vec{C}| = \sqrt{C_x^2 + C_y^2 + C_z^2}$

$$|\vec{C}| = \underline{\underline{30.8}} \text{ Answer.}$$

Can you write a unit vector that points in the direction of  $\vec{C}$ ?

$$\textcircled{5} \quad \hat{C} = \frac{\vec{C}}{|\vec{C}|} = \frac{1}{30.8} (25\hat{i} - 10\hat{j} + 15\hat{k})$$

Answer.

$$|\hat{C}| = 1 \quad \underline{\text{L.T.Y.}} \quad (\text{left to you})$$

These are NOT notes. They are a visual aid (20%) for a verbal explanation (80%).

4

Given:  $\vec{A} = 7\hat{i} - 4\hat{j}$

$$\vec{B} = -3\hat{i} - 2\hat{j}$$

If  $\vec{C} = 5\vec{A} + 4\vec{B}$  what is the \*magnitude and direction of  $\vec{C}$ ?

\* length and an angle ☺

$$+ 5\vec{A} = 35\hat{i} - 20\hat{j}$$

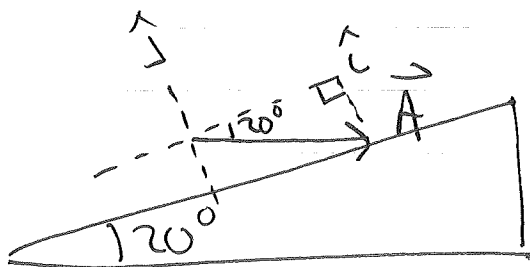
$$4\vec{B} = -12\hat{i} - 8\hat{j}$$

$$\vec{C} = 23\hat{i} - 28\hat{j}$$

$$|\vec{C}| = \sqrt{23^2 + 28^2} = 36.2$$

$$\theta = \tan^{-1}\left(\frac{28}{23}\right) = \underline{\underline{50.6^\circ}}$$

By convention, would report as "-50.6°"



$$\vec{A} = +|\vec{A}|\cos(20)\hat{i} - |\vec{A}|\sin(20)\hat{j}$$