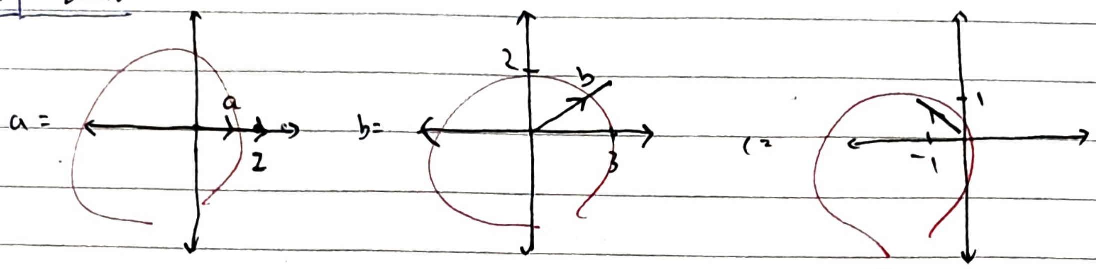
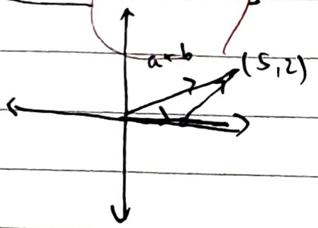
wk 1 tutorial

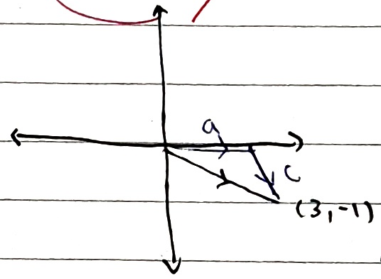
1) $a = \begin{bmatrix} 2 \\ 0 \end{bmatrix}$ $b = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$ $c = \begin{bmatrix} -1 \\ 1 \end{bmatrix}$

i Draw

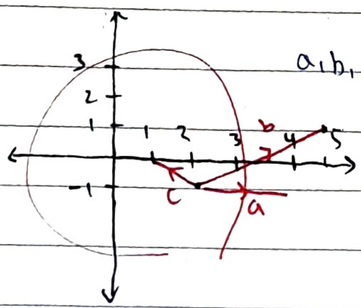


ii) $a + b = \begin{bmatrix} 5 \\ 2 \end{bmatrix}$ $a - c = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$

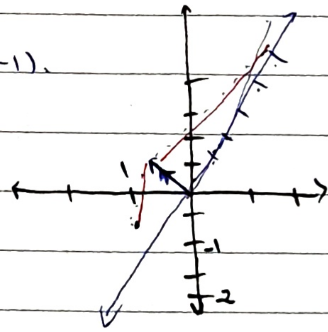




iii)

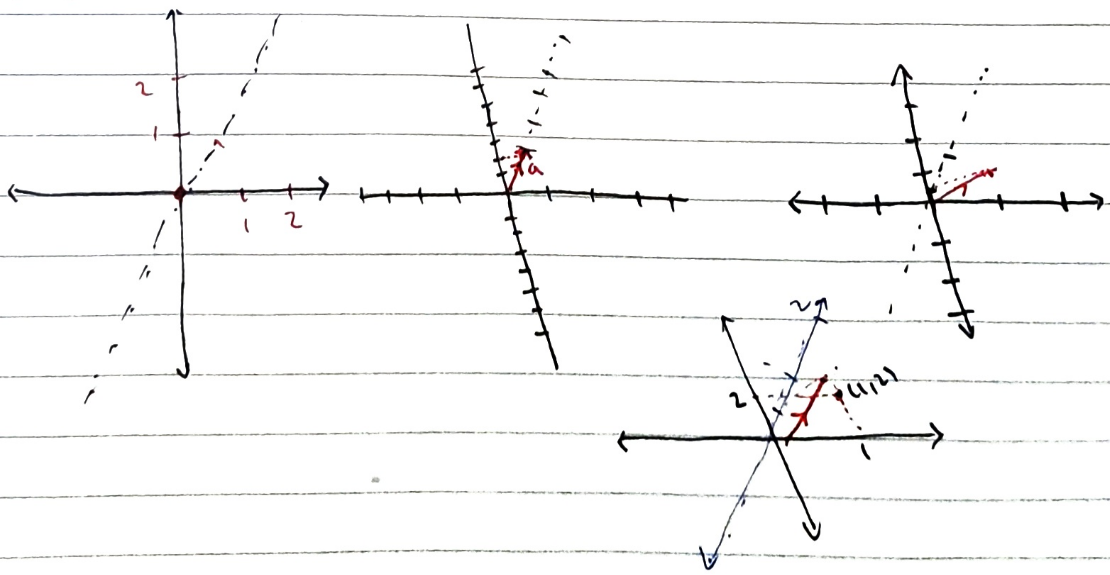


a, b, c with tail at (2, -1).

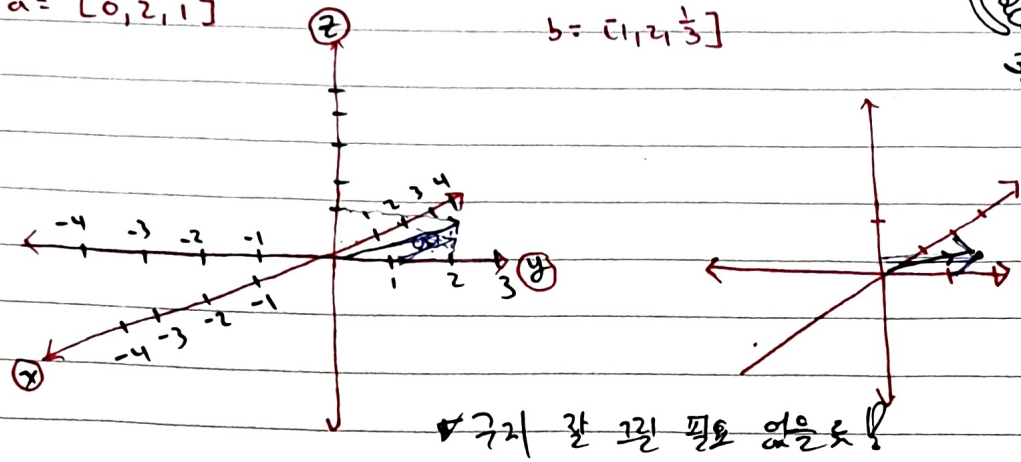


2 $a = [0, 2, 1]$ $b = [1, 2, \frac{1}{3}]$ $c = [-1, -\frac{1}{2}, 5]$

중요하지 않음
(그리기 개빡세요)



$a = [0,2,1]$ $b = [1,2,\frac{1}{3}]$



굳이 할 필요 없을듯!

b) $2a+3b = 2[0,2,1] + 3[1,2,\frac{1}{3}]$

$[0,4,2] + [3,6,1]$

$= [3,10,3]$

$-a+4b-c = -[0,2,1] + 4[1,2,\frac{1}{3}] - [-1,-\frac{1}{2},5]$

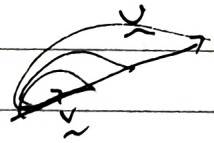
$= [0,-2,-1] + [4,8,\frac{4}{3}] + [1,\frac{1}{2},-5]$

$= [0+4+1, -2+8+\frac{1}{2}, -1+\frac{4}{3}-5]$

$= [5, \frac{13}{2}, -\frac{14}{3}]$

3) $|v| = 2 = \sqrt{v_1^2+v^2}$

i) $|u|$ when $u = 3v$ $\quad u = [3v_1, 3v_2]$



$\therefore |u| = \sqrt{9v_1^2+9v_2^2}$

$= \sqrt{9(v_1^2+v_2^2)} = 3\sqrt{v_1^2+v_2^2}$

$= 3 \cdot 2 = \boxed{6}$

ii) $\boxed{1}$ $\quad u = \frac{1}{2}v$

iii) $u = -3v \quad |u| = \boxed{6}$

iii) $v = 3u \quad u = \frac{1}{3}v \quad \therefore |u| = \frac{2}{3}$

4) $? = \boxed{a-b}$

$? = -a+b = \boxed{b-a}$

$? = \boxed{a+b}$

5) i) $v + x = u - w$

$x = u - v + w$

ii) $v - x = w - u$

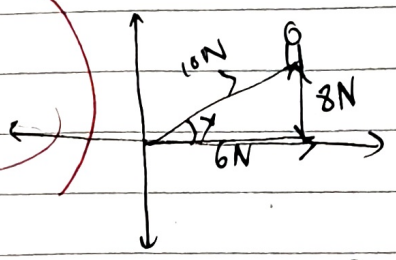
$x = u + v - w$

iii) $2v + x = 2w - 2u - x$

$2x = -2u - 2v + 2w$

$x = -u - v + w$

6)



magnitude = 10N

direction: northeast 53.13°

or (53° to horizontal & towards the right)

$\sin x = \frac{8}{10} = \frac{4}{5}$ $\sin^{-1} \frac{4}{5} = x$

$\csc x = \sin$ $= 53.13° + 360n$

or

$= 127° + 360n$.

7) $(a+b)+c = a+(b+c)$

$a = [a_1, a_2 \cdots a_n]$

$b = [b_1, b_2 \cdots b_n]$

$c = [c_1, c_2 \cdots c_n]$

$(a+b)+c = [a_1+b_1, a_2+b_2 \cdots a_n+b_n] + [c_1, c_2 \cdots c_n]$

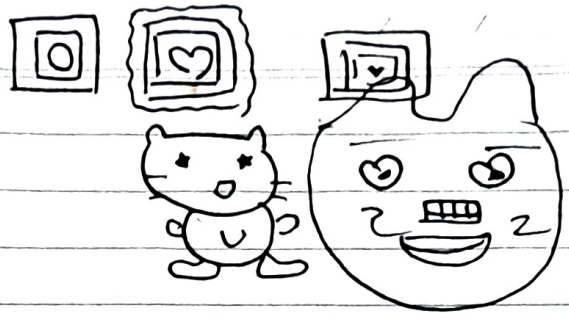
$= [a_1+b_1+c_1, a_2+b_2+c_2 \cdots a_n+b_n+c_n]$

$= [a_1+(b_1+c_1), a_2+(b_2+c_2) \cdots a_n+(b_n+c_n)]$

$= [a_1, a_2 \cdots a_n] + [(b_1+c_1), (b_2+c_2), \cdots (b_n+c_n)]$

$= a + ([b_1, b_2 \cdots b_n] + [c_1, c_2 \cdots c_n])$

$= a + (b + c)$



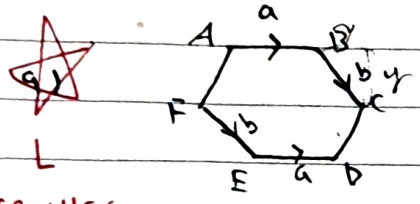
8) $2a - 3b$ when $a = u + v$, $b = 3u - 2v$

$= 2(u+v) - 3(3u-2v)$

$= 2u + 2v - 9u + 6v$

$= (2u - 9u) + (2v + 6v)$

$= -7u + 8v$



L

$-\vec{b}$

$\overrightarrow{CD} = b - \vec{b}$

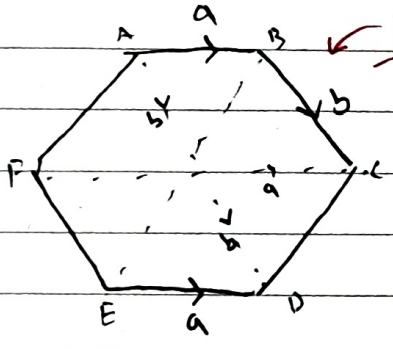
regular hexagon의 뜻을 몰랐음 (정육각형)

$\vec{h} = [x+y]$

$(\vec{A})\vec{h} = [-x, +y]$

$\begin{bmatrix} -1 \\ 1 \end{bmatrix} \times \begin{bmatrix} x \\ y \end{bmatrix} =$

$a \quad a + 2y$



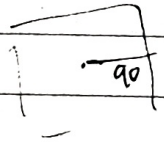
보조선 !!

$\overrightarrow{CD} = -a + b = b - a$

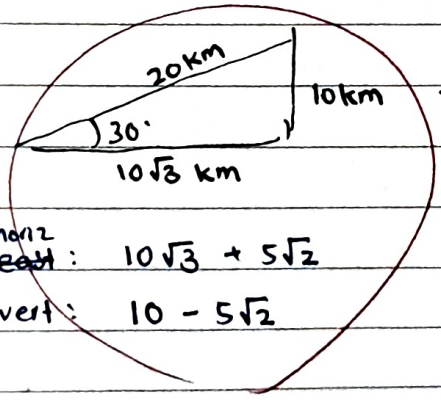
$\overrightarrow{DE} = -a$

$\overrightarrow{EF} = -b$

$\overrightarrow{FA} = a - b$



10)



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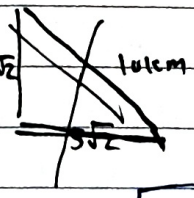

horiz ~~east~~ : $10\sqrt{3} + 5\sqrt{2}$

vert : $10 - 5\sqrt{2}$

magnitude : $\sqrt{(10\sqrt{3} + 5\sqrt{2})^2 + (10 - 5\sqrt{2})^2}$

$= 24.5668 \text{ km}$

direction $\tan^{-1}\left(\frac{10 - 5\sqrt{2}}{10\sqrt{3} + 5\sqrt{2}}\right) = 6.847°$