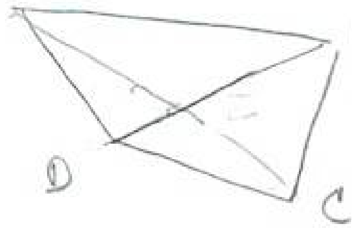
203 §12.2 #s 4, 5, 15, 17, 19, 23, 51

(4) Write each combo as a single vector.



(a) $\overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AC}$

(b) $\overrightarrow{CD} + \overrightarrow{DB} = \overrightarrow{CB}$

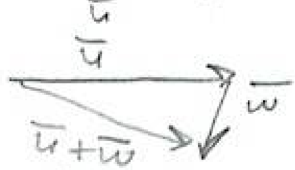
(c) $\overrightarrow{DB} - \overrightarrow{AB} = \overrightarrow{DA}$

(d) $\overrightarrow{DC} + \overrightarrow{CA} + \overrightarrow{AB} = \overrightarrow{DB}$

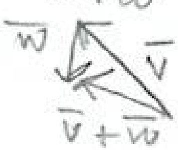
(5) Copy the vectors & use them to draw the following compose

(a) $\bar{u} + \bar{v}$

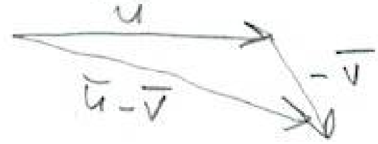
(b) $\bar{u} + \bar{w}$



(c) $\bar{v} + \bar{w}$



(d) $\bar{u} - \bar{v}$



(e) $\bar{v} + \bar{u} + \bar{w}$

(f) $\bar{u} - \bar{w} - \bar{v}$

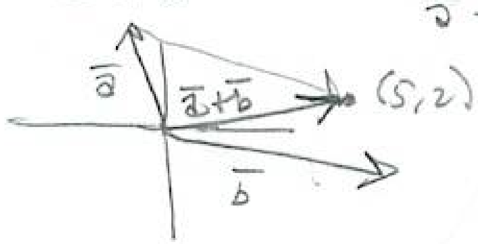
203 §12.2 #s 15, 17, 19, 23, 51

#s 15 – 18 Find the sum & illustrate geometrically

(15) $\bar{a}+\bar{b}$, $4\bar{a}+2\bar{b}$, $\|\bar{a}\|$, $\|a-b\|$

$\bar{a} = \langle -1, 4\rangle$, $\bar{b} = \langle 6, -2\rangle$

$\bar{a}+\bar{b}$



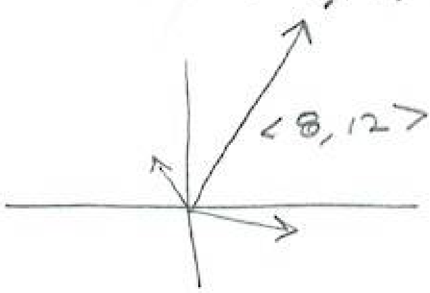
$\bar{a}+\bar{b} = \langle -1+6, 4-2\rangle$

$= \langle 5, 2\rangle$

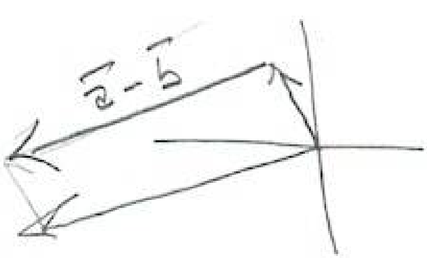
$4\bar{a}+2\bar{b} = 4\langle -1, 4\rangle + 2\langle 6, -2\rangle$

$= \langle -4, 16\rangle + \langle 12, -4\rangle = \boxed{\langle 8, 12\rangle}$

$= 4\bar{a}+2\bar{b}$



$\|\bar{a}\| = \sqrt{1^2+4^2} = \boxed{\sqrt{17} = \|\bar{a}\|}$



$\|\bar{a}-\bar{b}\| = \|\langle -1-6, 4-(-2)\rangle\|$

$= \|\langle -7, 6\rangle\|$

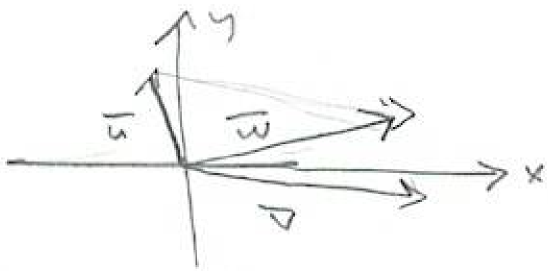
$= \sqrt{49+36} = \boxed{\sqrt{85}}$

$5 \,\lfloor 85$
17

203 §12.2 ~~4~~, 15, 17, 19, 23, 51

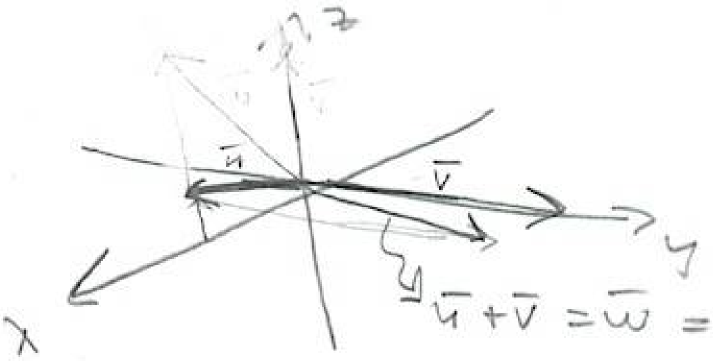
(15) Find the sum & illustrate geometrically.

$\langle -1,4\rangle + \langle 6,-2\rangle = \langle 5,2\rangle = \bar{u}+\bar{v}=\bar{w}$



(17) $\langle 3,0,1\rangle + \langle 0,8,0\rangle = \bar{u}+\bar{v}=\bar{w}$

$= \langle 3,8,1\rangle$



$\bar{u}+\bar{v}=\bar{w} = \langle 3,8,1\rangle$

(23) Find unit vector in same direction as $\langle 6,-2\rangle = \bar{u}$

$\|\bar{u}\| = \sqrt{6^2+2^2} = \sqrt{40} = 2\sqrt{10}$

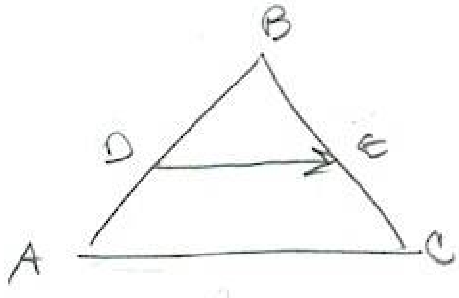
$\Rightarrow \bar{v} = \frac{1}{\|\bar{u}\|}\bar{u} = \frac{1}{2\sqrt{10}}\langle 6,-2\rangle$

$= \frac{\sqrt{10}}{2 \cdot 10}\langle 6,-2\rangle$

$= \boxed{\left\langle \frac{3\sqrt{10}}{10}, -\frac{\sqrt{10}}{10}\right\rangle}$

203 §12.2 #51

(51) Prove the line joining the midpoints of 2 sides of a triangle is parallel to the 3rd side & ½ its length.



$\bar{u} = \overrightarrow{AB} \Rightarrow \overrightarrow{DB} = \frac{1}{2}\bar{u}$

$\bar{v} = \overrightarrow{BC} \Rightarrow \overrightarrow{BE} = \frac{1}{2}\bar{v}$

$\overrightarrow{AC} = \bar{u} + \bar{v} \Rightarrow$

$\frac{1}{2}\overrightarrow{AC} = \frac{1}{2}(\bar{u} + \bar{v})$ is $\frac{1}{2}$ the length & parallel to $\overrightarrow{AC}$.