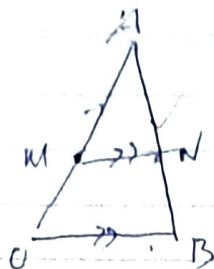


LH - Intro to Vector



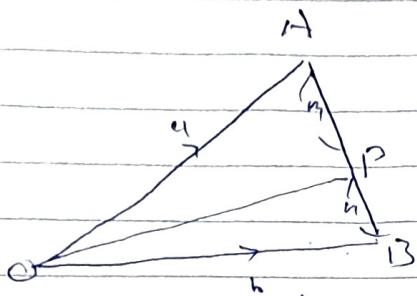
$$\vec{OB} = \vec{OC} + \vec{CB}$$

$$\vec{OB} = 2\vec{OM} + 2\vec{AN}$$

$$\frac{\vec{OB}}{2} = \vec{MA} + \vec{AN} = \vec{MN}$$

$$\therefore \vec{MN} = \frac{1}{2} \vec{OB}$$

$$\therefore \vec{MN} \parallel \vec{OB}$$



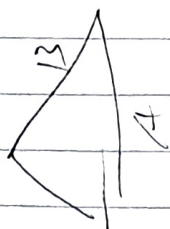
$$\vec{OP} = \vec{OA} + \vec{AP}$$

$$\vec{AB} = \vec{OB} - \vec{OA}$$

$$\vec{AP} = \frac{m}{m+n} \vec{AB}$$

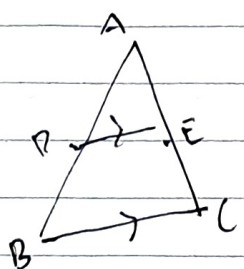
$$\therefore \vec{AP} = \frac{m}{m+n} (-a+b)$$

$$\therefore \vec{OP} = a + \frac{m}{m+n} (-a+b)$$



$$\frac{a(m+n) + m(-a+b)}{m+n} = \frac{am + an - am + bm}{m+n}$$

$$= \frac{an + bm}{m+n}$$



prove  $\vec{DE} \parallel \vec{BC}$

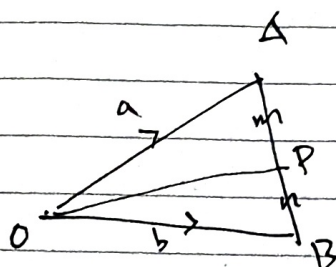
$$\vec{DE} = \vec{DA} + \vec{AE}$$

$$2\vec{DE} = 2\vec{DA} + 2\vec{AE}$$

$$= 2\vec{DE} = \vec{BA} + \vec{AC} = \vec{BC}$$

$$\therefore 2\vec{DE} = \vec{BC}$$

$$\therefore \vec{DE} \parallel \vec{BC}$$



find  $\vec{OP}$  in terms of  $a, b$

$$\vec{OP} = \vec{OA} + \vec{AP}$$

$$= a + \frac{m}{m+n} \vec{AB}$$

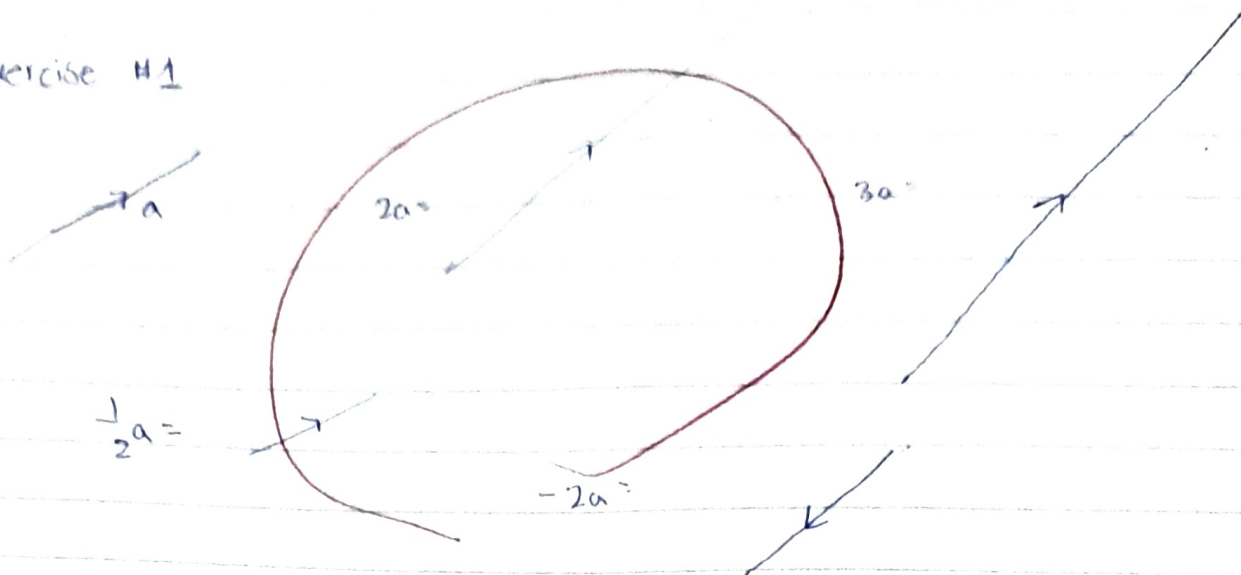
$$= a + \frac{m}{m+n} (-a+b)$$

$$\frac{am + an - am + bm}{m+n} = \frac{an + bm}{m+n}$$

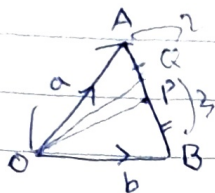
Handwritten notes in a red circle:   
  $\vec{AB} = \vec{OB} - \vec{OA}$    
  $\vec{AB} = b - a$    
  $\vec{AP} = \frac{m}{m+n} \vec{AB}$    
  $\vec{AP} = \frac{m}{m+n} (b - a)$

# LH - Intro to Vector

## Exercise #1



## Exercise #2



a.  $\overrightarrow{AB} = \boxed{b - a}$

b.  $\overrightarrow{BA} = \boxed{a - b}$

c.  $\overrightarrow{OP} = \overrightarrow{OA} + \frac{1}{2} \overrightarrow{AB}$   
 $= a + \frac{1}{2}(b - a)$   
 $= a - \frac{a}{2} + \frac{b}{2} = \boxed{\frac{a + b}{2}}$

d.  $\overrightarrow{AP} = \boxed{\frac{1}{2}(b - a)}$

e.  $\overrightarrow{BP} = \boxed{\frac{1}{2}(a - b)}$

f.  $\overrightarrow{OQ} = a + \frac{2}{5}(b - a)$   
 $= \boxed{\frac{3}{5}a + \frac{2}{5}b}$

## Exercise #3

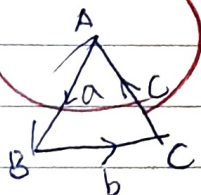
Unit vector is a vector of magnitude 1

and a direction due to

## Exercise #4

$3e = 3$

## Exercise #5



$\overrightarrow{AA} = \mathbf{0}$



# Pre-tut wlc 1

$$\vec{PQ} = \vec{PO} + \vec{OQ}$$

$$\vec{PQ} = -\vec{OP} + \vec{OQ}$$

$$= \vec{OQ} - \vec{OP}$$

①

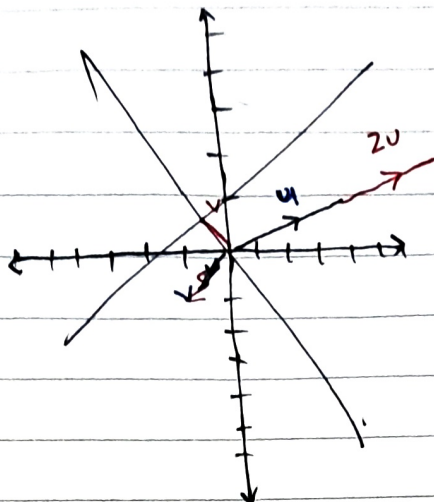
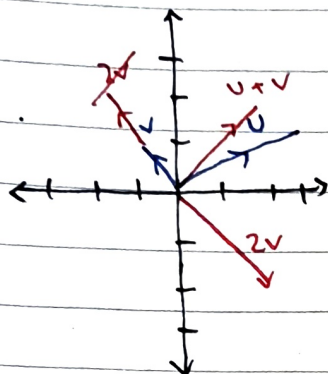
$$u = [3, 1]$$

$$v = [-1, 1]$$

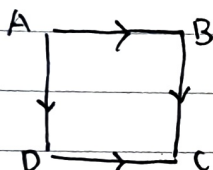
$$u+v = [2, 2]$$

$$-2v = [-2, 2]$$

$$= [2, -2]$$



②



1. false
2. false
3. true
4. true

③

$$1. 3\vec{a} + 2\vec{b} - 4(\frac{1}{2}\vec{b} + \frac{1}{2}\vec{a})$$

$$3\vec{a} + 2\vec{b} - 4\vec{b} - 2\vec{a}$$

$$= \vec{a} - 2\vec{b}$$

$$2. -(\vec{w} - 6\vec{z}) - 2\vec{w} + \vec{v} - 2\vec{z}$$

$$-\vec{w} + 6\vec{z} - 2\vec{w} + \vec{v} - 2\vec{z}$$

$$\vec{v} - 3\vec{w} + 4\vec{z}$$

④