3b) $|E| = \begin{vmatrix} 1 & 2 & 3 & 4 \\ 2 & 0 & 0 & 3 \\ 3 & 0 & 0 & 2 \\ 4 & 3 & 2 & 1 \end{vmatrix}$ $b_{21}\left(\frac{-2}{1}\right)$, $b_{31}\left(\frac{-3}{1}\right)$, $b_{41}\left(\frac{-4}{1}\right)$

$\begin{vmatrix} 1 & 2 & 3 & 4 \\ 0 & -4 & -6 & -5 \\ 0 & -6 & -9 & -10 \\ 0 & -5 & -10 & -15 \end{vmatrix}$ $b_{32}\left(\frac{+6}{-4}\right)$, $b_{42}\left(\frac{+5}{-4}\right)$

$\begin{vmatrix} 1 \\ 0 \\ 0 \\ 0 \end{vmatrix}$

$b_2 = b_2 + (-2)b_1$

b_2:	2	0	0	3
$-2b_1$:	-2	-4	-6	-8 +
b_2:	0	-4	-6	-5

$b_3 = b_3 + (-3)b_1$

b_3:	3	0	0	2
$-3b_1$:	-3	-6	-9	-12 +
b_3:	0	-6	-9	-10

$b_4 = b_4 + (-4)b_1$

b_4:	4	3	2	1
$-4b_1$:	-4	-8	-12	-16 +
b_4:	0	-5	-10	-15

$b_3 = b_3 + (-\frac{3}{2})b_2$

b_3:	0	-6	-9	-10
$-\frac{3}{2}b_2$:	0	6	9	$\frac{15}{2}$ +
b_3:	0	0	0	$-\frac{5}{2}$

$b_4 = b_4 + (-\frac{5}{4}$

b_4:	0	-5
$-\frac{5}{4}b_2$:	0	5
b_4:	0	0

$$\begin{array}{cccc} \cdot & 2 & 3 & 4 \\ \cdot & -4 & -6 & -5 \\ -6 & -9 & -10 & \\ -5 & -10 & -15 & \end{array} \quad \begin{array}{l} b_{32}\left(\frac{+6}{-4}\right) \\ b_{42}\left(\frac{+5}{-4}\right) \end{array}$$

$$\left|\begin{array}{cccc} 1 & 2 & 3 & 4 \\ 0 & -4 & -6 & -5 \\ 0 & 0 & 0 & -\frac{5}{2} \\ 0 & 0 & -\frac{5}{2} & -\frac{35}{4} \end{array}\right| \xrightarrow[b_{43}]{b_{34}} - \left|\begin{array}{cccc} 1 & 2 & 3 & 4 \\ 0 & -4 & -6 & -5 \\ 0 & 0 & -\frac{5}{2} & -\frac{35}{4} \\ 0 & 0 & 0 & -\frac{5}{2} \end{array}\right|$$

$$b_4 = b_4 + \left(-\frac{5}{4}\right) b_2$$

$$\begin{array}{lcccc} b_4: & 0 & -5 & -10 & -15 \\ -\frac{5}{4} b_2: & 0 & 5 & \frac{15}{2} & \frac{25}{4} \\ \hline b_4: & 0 & 0 & -\frac{5}{2} & -\frac{35}{4} \end{array}$$

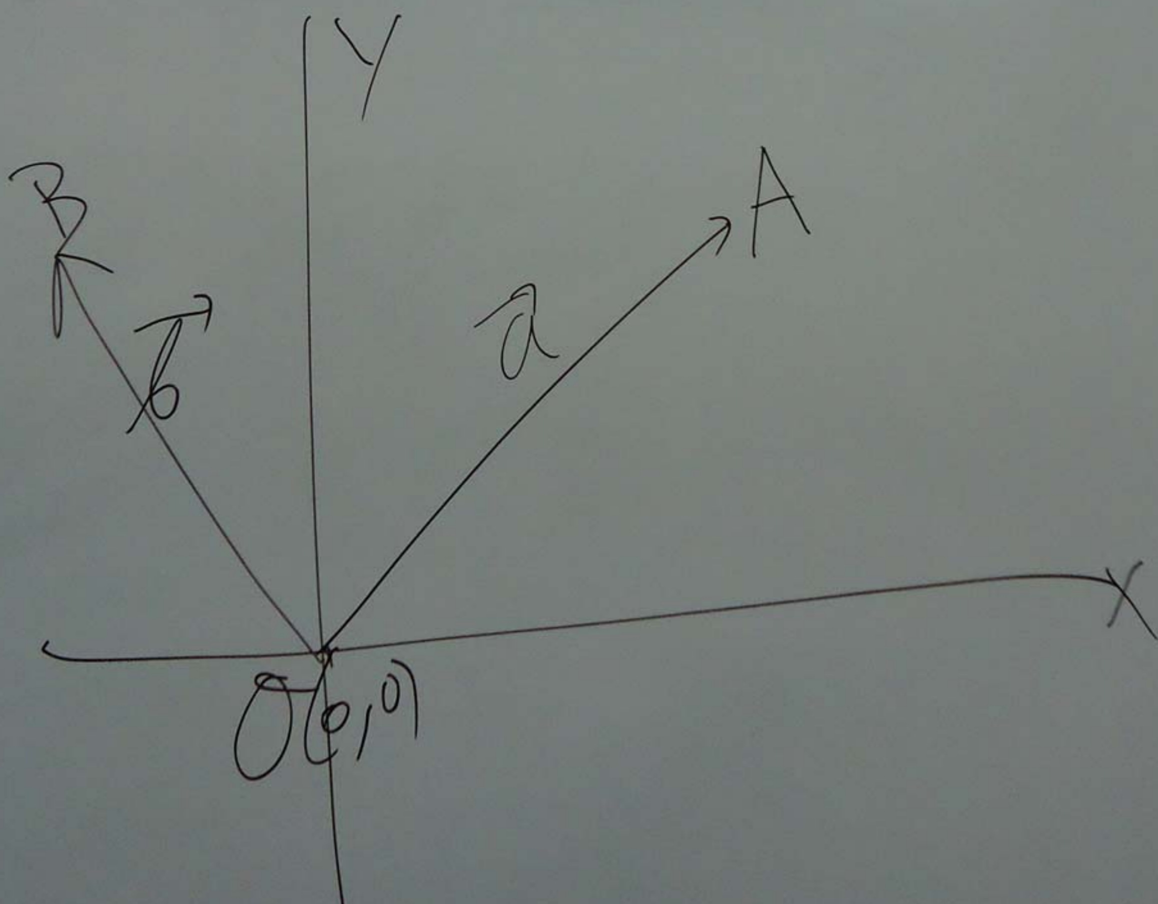
$$= -(1)(-4)\left(-\frac{5}{2}\right)\left(-\frac{5}{2}\right)$$

$$= 25$$

VEKTOR di R^2

VEKTOR POSISI

VEKTOR YG BERTITIK PANGKAL PADA O(0,0)



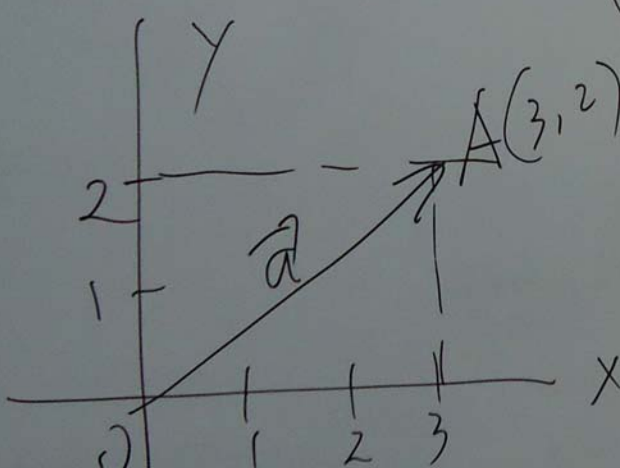
$\overrightarrow{OA} = \vec{a} = \bar{a} = \underline{a} = \vec{A}$

$\overrightarrow{OB} = \vec{b} = \bar{b} = \underline{b} = \vec{B}$

VEKTOR NOL

$\vec{O} = (0,0)$

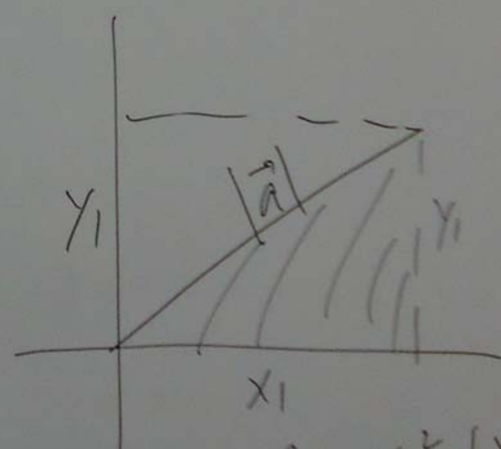
$\vec{a} = (3,2) = \begin{pmatrix}3\\2\end{pmatrix} = \begin{bmatrix}3\\2\end{bmatrix}$



$\vec{a} = (x_1, y_1)$

PANJANG VEKTOR

$= |\vec{a}| = ||\vec{a}|| = \sqrt{x_1^2 + \ldots}$



$|\vec{a}|^2 = x_1^2 + y_1^2$

$|\vec{a}| = \sqrt{x_1^2 + y_1^2}$

$$\vec{a} = (x_1, y_1)$$
$$\vec{b} = (x_2, y_2)$$

JIKA $\begin{cases} x_1 = x_2 \\ y_1 = y_2 \end{cases}$

$\longrightarrow$ $\boxed{\vec{a} = \vec{b}}$

CARA ANALITIS

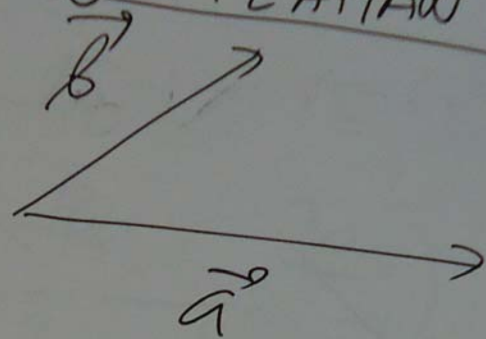
$$\vec{a} = (x_1, y_1)$$
$$\vec{b} = (x_2, y_2) \quad +$$

$$\vec{a} + \vec{b} = (x_1 + x_2, y_1 + y_2)$$

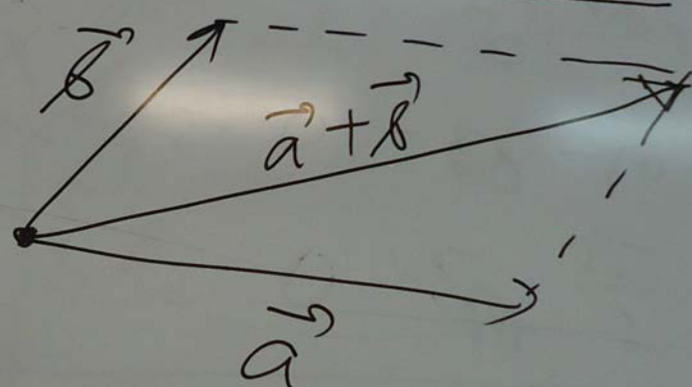
(I)

CARA GRAFIS

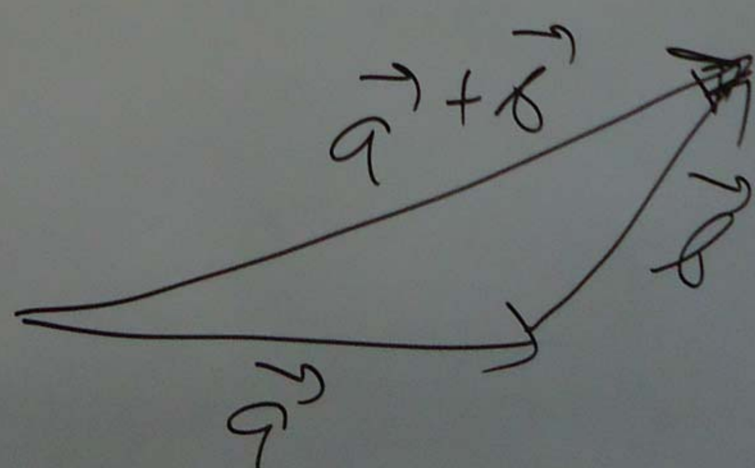
(I) PENJUMLAHAN VEKTOR

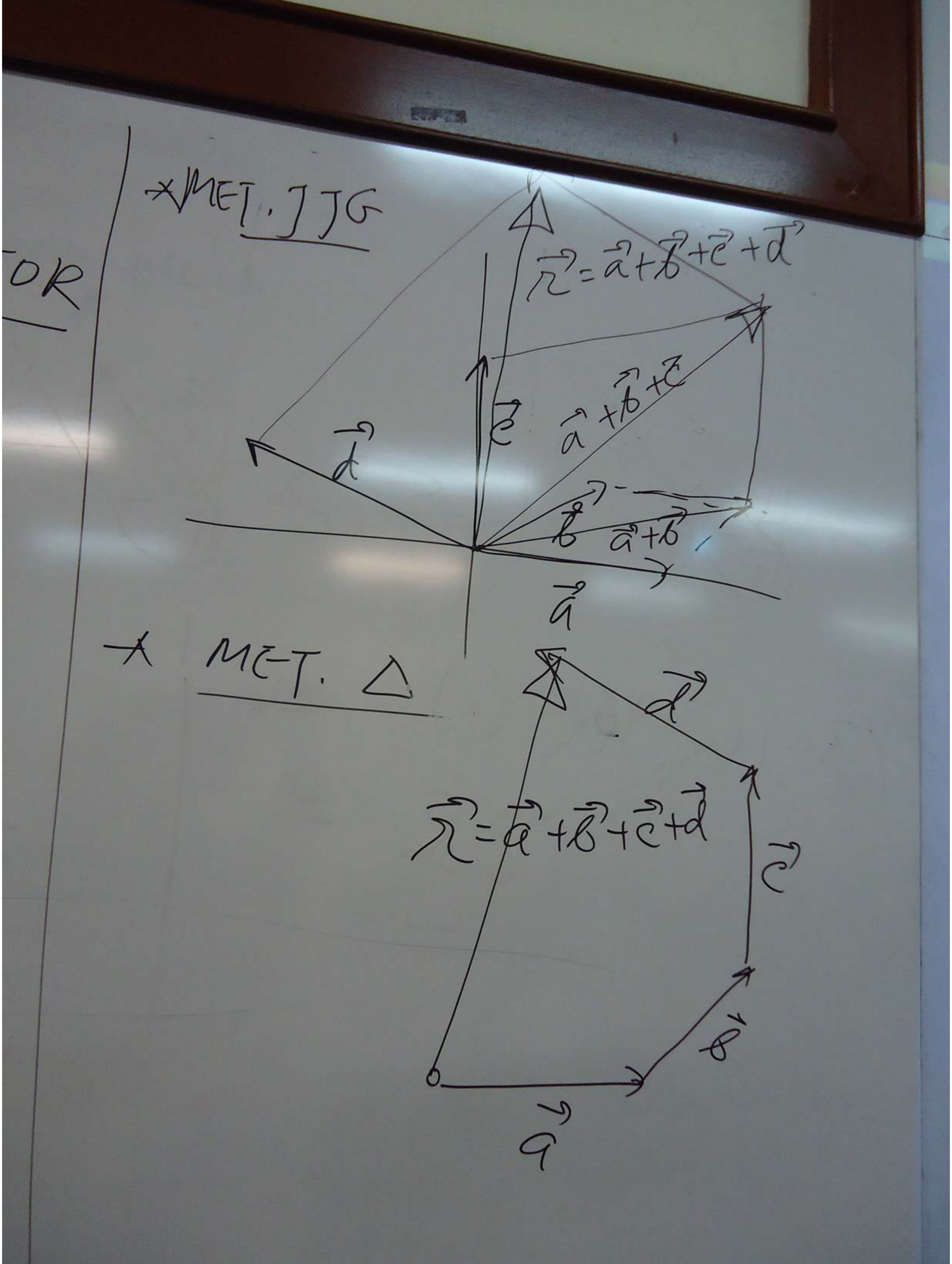


a) METODE JJG



b) METODE SEGITIGA





TOR
* MET. JJG
$\vec{r} = \vec{a} + \vec{b} + \vec{c} + \vec{d}$
$\vec{a} + \vec{b} + \vec{c}$
$\vec{c}$
$\vec{d}$
$\vec{b}$
$\vec{a} + \vec{b}$
$\vec{a}$
* MET. △
$\vec{d}$
$\vec{r} = \vec{a} + \vec{b} + \vec{c} + \vec{d}$
$\vec{c}$
$\vec{b}$
O
$\vec{a}$

II) PENGURANGAN 2 VEKTOR

$$\vec{a} - \vec{b} = \vec{a} + (-\vec{b})$$

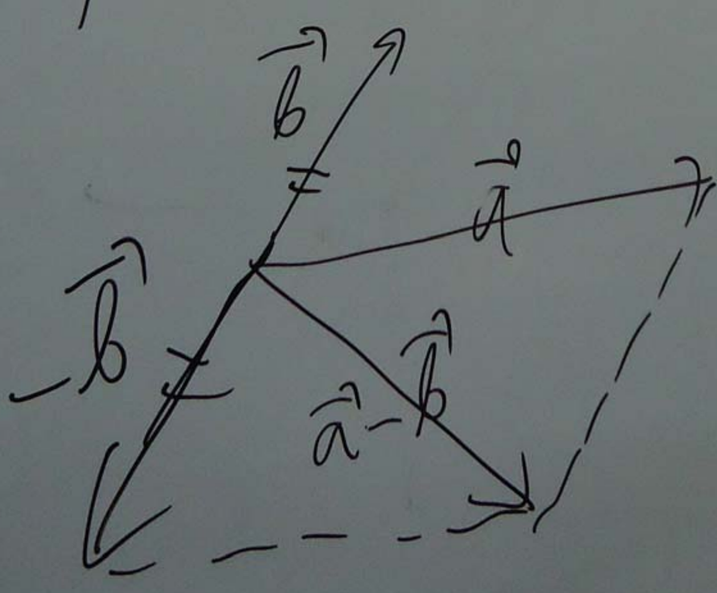
SECARA ANALITIS

$$\vec{a} = (x_1, y_1)$$
$$\vec{b} = (x_2, y_2) \quad -$$

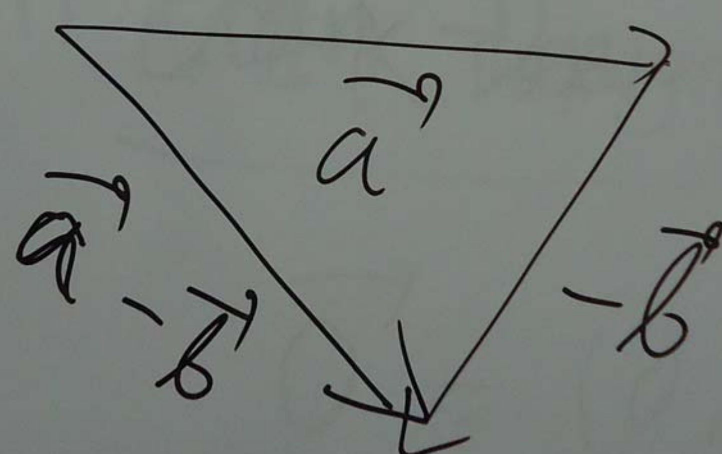
$$\vec{a} - \vec{b} = (x_1 - x_2, y_1 - y_2)$$

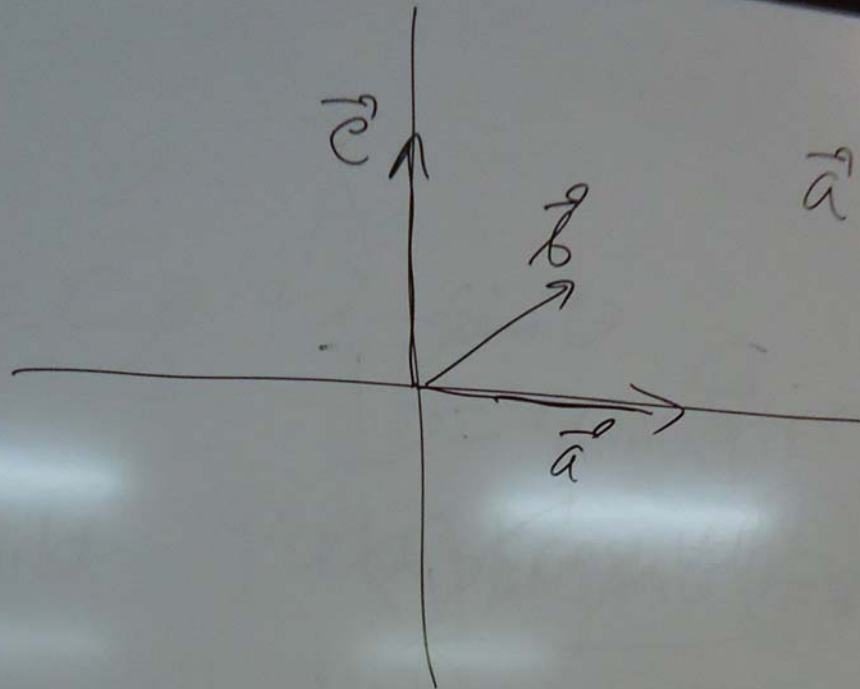
SECARA GRAFIS

a) MET. JJG



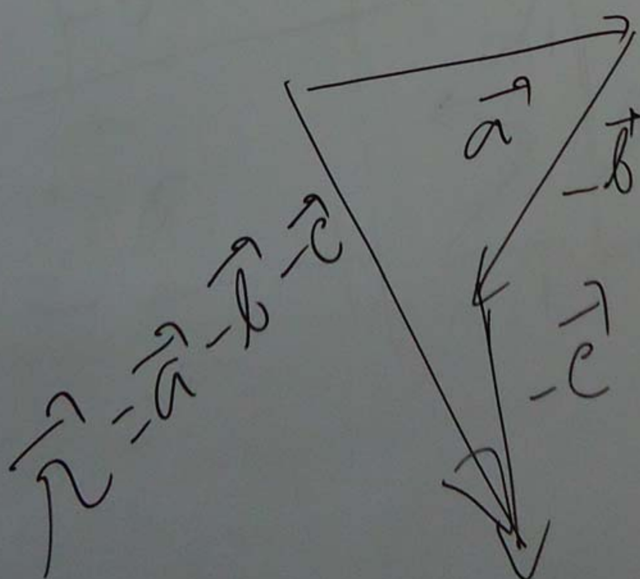
б) МЕТ. △





$\vec{a} - \vec{b} - \vec{c}$

MET. Δ



DOT VECTOR

= PERKALIAN TITIK

= PERKALIAN SKALAR

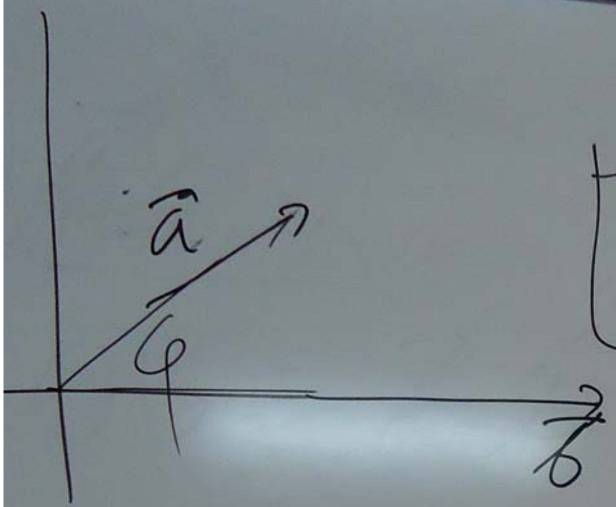
$$\vec{a} \cdot \vec{b}$$

$\vec{a} = (x_1, y_1)$

$\vec{b} = (x_2, y_2)$

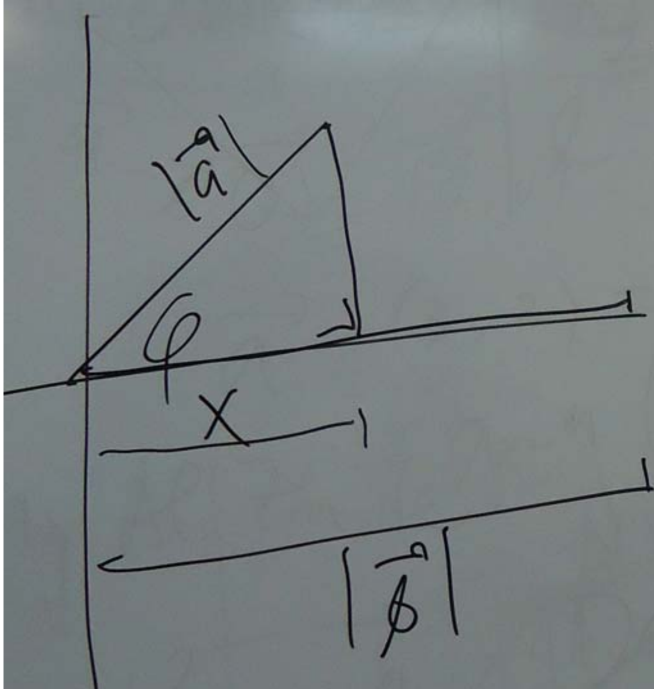
?

→ $$\vec{a} \cdot \vec{b} = x_1 x_2 + y_1 y_2$$



?

$$\vec{a} \cdot \vec{b} = |\vec{a}| \cdot |\vec{b}| \cdot \cos\varphi$$

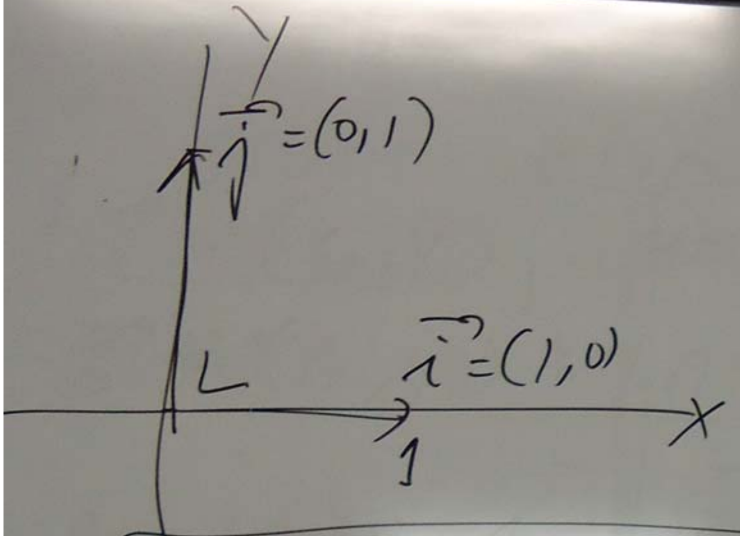


$$\frac{x}{|\vec{a}|} = \cos\varphi \longrightarrow x = |\vec{a}| \cdot \cos\varphi$$

$$\vec{a} \cdot \vec{b} = x \cdot |\vec{b}|$$

$$= |\vec{a}| \cdot \cos\varphi \cdot |\vec{b}|$$

$$\vec{a} \cdot \vec{b} = |\vec{a}| \cdot |\vec{b}| \cos\varphi$$



$$\vec{i} = (1,0) \to |\vec{i}| = \sqrt{1^2+0^2} = 1$$

$$\vec{j} = (0,1) \to |\vec{j}| = \sqrt{0^2+1^2} = 1$$

$$\vec{a} \cdot \vec{b} = |\vec{a}| \cdot |\vec{b}| \cos\theta$$

$$\vec{i} \cdot \vec{i} = \underbrace{|\vec{i}|}_{1} \cdot \underbrace{|\vec{i}|}_{1} \cdot \underbrace{\cos 0}_{1} = 1$$

$$\vec{j} \cdot \vec{j} = \underbrace{|\vec{j}|}_{1} \cdot \underbrace{|\vec{j}|}_{1} \cdot \underbrace{\cos 0}_{1} = 1$$

$$\vec{i} \cdot \vec{j} = \underbrace{|\vec{i}|}_{1} \cdot \underbrace{|\vec{j}|}_{1} \cdot \underbrace{\cos 90^\circ}_{0} = 0$$

$$\vec{j} \cdot \vec{i} = \underbrace{|\vec{j}|}_{1} \cdot \underbrace{|\vec{i}|}_{1} \cdot \underbrace{\cos 90^\circ}_{0} = 0$$

$$\vec{a} = (x_1, y_1) = x_1 \vec{i} + y_1 \vec{j}$$

$$\vec{b} = (x_2, y_2) = x_2 \vec{i} + y_2 \vec{j}$$

$$\vec{a} \cdot \vec{b} = (x_1 \vec{i} + y_1 \vec{j}) \cdot (x_2 \vec{i} + y_2 \vec{j})$$

$$= x_1 x_2 (\underbrace{\vec{i} \cdot \vec{i}}_{1}) + x_1 y_2 (\underbrace{\vec{i} \cdot \vec{j}}_{0}) + x_2 y_1 (\underbrace{\vec{j} \cdot \vec{i}}_{0}) + y_1 y_2 (\underbrace{\vec{j} \cdot \vec{j}}_{1})$$

$$\vec{a} \cdot \vec{b} = x_1 x_2 + y_1 y_2$$