# SOALAN RAMALAN

## MATEMATIK TAMBAHAN

## KERTAS 1

**VEKTOR**

*VECTOR*

**SIR VEN**
*(GURU ADIWIRA KEBANGSAAN 2019)*

**SPM 2023**

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**VEKTOR**
*VECTOR*

(a) Jika $\underset{\sim}{x} = 2\underset{\sim}{i} - \underset{\sim}{j}$ dan $\underset{\sim}{y} = -\underset{\sim}{i} + 3\underset{\sim}{j}$, carikan nilai $p$ jika $2p\underset{\sim}{x} + 3\underset{\sim}{y}$ selari dengan paksi-$x$.

*If $\underset{\sim}{x} = 2\underset{\sim}{i} - \underset{\sim}{j}$ and $\underset{\sim}{y} = -\underset{\sim}{i} + 3\underset{\sim}{j}$, find the value of $p$ if $2p\underset{\sim}{x} + 3\underset{\sim}{y}$ parallel to x-axis.*

[3 marks]
[3 mar

(b) Diberi titik-titik $A(-1, 2)$ dan $B(4, 3)$. Cari

*Given points $A(-1, 2)$ and $B(4, 3)$. Find*

(i) $\overrightarrow{AB}$

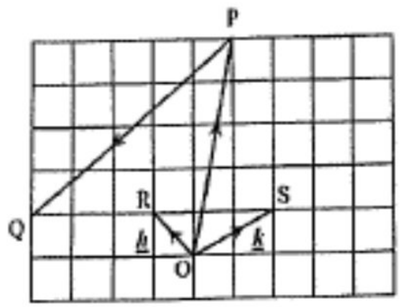
(ii) vektor unit bagi $\overrightarrow{AB}$

*unit vector of $\overrightarrow{AB}$*

[3 mar
[3 ma

(c) Rajah 13 menunjukkan vektor $\overrightarrow{OR} = \underset{\sim}{h}$, $\overrightarrow{OS} = \underset{\sim}{k}$, $\overrightarrow{OP}$ dan $\overrightarrow{PQ}$ dilukis pada grid segi e
sama.

*Diagram 13 show vector $\overrightarrow{OR} = \underset{\sim}{h}$, $\overrightarrow{OS} = \underset{\sim}{k}$, $\overrightarrow{OP}$ and $\overrightarrow{PQ}$ are drawn on the square grids.*




Rajah 13 / *Diagram 13*

Ungkapkan dalam sebutan $\underset{\sim}{h}$ dan $\underset{\sim}{k}$

*Express in terms of h and k*

(i) $\overrightarrow{OP}$

(ii) $\overrightarrow{PQ}$

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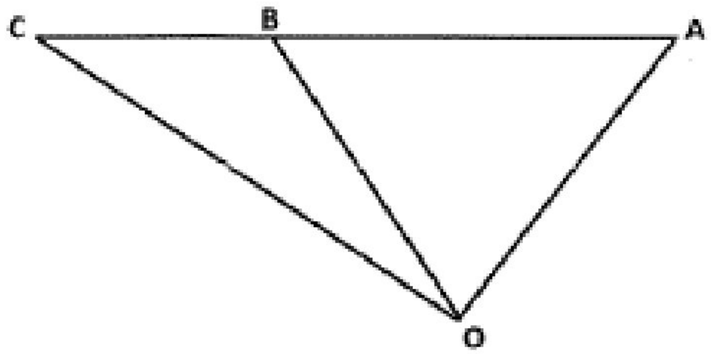
(a) Rajah 3 menunjukkan segi tiga $OAC$. Diberi bahawa $BC = \frac{2}{3}AB$, $\overrightarrow{BO} = \underset{\sim}{x}$ dan $\overrightarrow{AB} = \underset{\sim}{y}$.

*Diagram 3 shows a triangle OAC. Given that* $BC = \frac{2}{3}AB$, $\overrightarrow{BO} = \underset{\sim}{x}$ *and* $\overrightarrow{AB} = \underset{\sim}{y}$.




Rajah 3 / *Diagram 3*

Ungkapkan $\overrightarrow{CO}$ dalam sebutan $\underset{\sim}{x}$ dan/atau $\underset{\sim}{y}$. [2 *markah*]

*Express* $\overrightarrow{CO}$ *in terms of* $\underset{\sim}{x}$ *and/or* $\underset{\sim}{y}$. [2 *marks*]

(b) Seterusnya, cari vektor unit dalam arah $\overrightarrow{OC}$, jika $\underset{\sim}{x} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$ dan $\underset{\sim}{y} = \begin{pmatrix} -3 \\ 0 \end{pmatrix}$. [3 *markah*]

*Hence, find the unit vector in the direction of* $\overrightarrow{OC}$ *if* $\underset{\sim}{x} = \begin{pmatrix} 2 \\ -3 \end{pmatrix}$ *and* $\underset{\sim}{y} = \begin{pmatrix} -3 \\ 0 \end{pmatrix}$. [3 *marks*]

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Diberi $\underset{\sim}{p} = \begin{pmatrix} 5 \\ -12 \end{pmatrix}$ dan $\underset{\sim}{q} = \begin{pmatrix} k+2 \\ 3 \end{pmatrix}$. Cari

*Given* $\underset{\sim}{p} = \begin{pmatrix} 5 \\ -12 \end{pmatrix}$ *and* $\underset{\sim}{q} = \begin{pmatrix} k+2 \\ 3 \end{pmatrix}$. *Find*

(a) $|\underset{\sim}{p}|$.

(b) nilai $k$ dengan keadaan $\underset{\sim}{p} + \underset{\sim}{q}$ adalah selari dengan paksi-$y$.

*the value of k such that* $\underset{\sim}{p} + \underset{\sim}{q}$ *is parallel to the y-axis.*

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$\overrightarrow{ON} = \overrightarrow{OM} + \overrightarrow{MN}$ *atau*

$= 6\underline{i} + 5\underline{j} - (4\underline{i} + \underline{j})$

$= 2\underline{i} + 4\underline{j}$

$|\overrightarrow{ON}| = \sqrt{2^2 + 4^2}$

$= \sqrt{20}$

*vektor unit* $\overrightarrow{ON} = \frac{1}{\sqrt{20}}(2\underline{i} + 4\underline{j})$

$\overrightarrow{LN} = \overrightarrow{LO} + \overrightarrow{ON}$

$= -(4\underline{i} + \underline{j}) + 2\underline{i} + 4\underline{j}$

$= -2\underline{i} + 3\underline{j}$

$\overrightarrow{NP} = \overrightarrow{NO} + \overrightarrow{OP}$

$= -(2\underline{i} + 4\underline{j}) + (-8\underline{i}) + 19\underline{j}$

$= -10\underline{i} + 15\underline{j}$

$\overrightarrow{OA} = \begin{pmatrix} -1 \\ 2 \end{pmatrix} \quad \overrightarrow{OB} = \begin{pmatrix} 4 \\ 3 \end{pmatrix}$

$\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB}$

$= \begin{pmatrix} 1 \\ -2 \end{pmatrix} + \begin{pmatrix} 4 \\ 3 \end{pmatrix}$

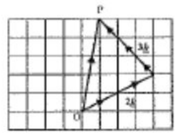
$= \begin{pmatrix} 5 \\ 1 \end{pmatrix}$

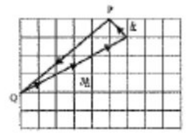
$|\overrightarrow{AB}| = \sqrt{5^2 + 1^2} = \sqrt{26}$

$\overrightarrow{AB} = \frac{1}{\sqrt{26}}\begin{pmatrix} 5 \\ 1 \end{pmatrix}$

$\overrightarrow{OP} = 2\underline{k} + 3\underline{h}$

$\overrightarrow{PQ} = -3\underline{k} - \underline{h}$




$\overrightarrow{CO} = -\frac{2}{3}\overrightarrow{AB} + \overrightarrow{BO}$

$\overrightarrow{CO} = -\frac{2}{3}\underset{\sim}{y} + \underset{\sim}{x}$

$\overrightarrow{OC} = \frac{2}{3}\underset{\sim}{y} - \underset{\sim}{x}$

$\frac{2}{3}\begin{pmatrix} -3 \\ 0 \end{pmatrix} - \begin{pmatrix} 2 \\ -3 \end{pmatrix} = \begin{pmatrix} -4 \\ 3 \end{pmatrix}$

$|\overrightarrow{OC}| = \sqrt{(-4)^2 + 3^2}$

vektor unit $\overrightarrow{OC} = \frac{1}{5}\begin{pmatrix} -4 \\ 3 \end{pmatrix}$

$|\underset{\sim}{p}| = \sqrt{5^2 + (-12)^2} = 13$

$\underset{\sim}{p} + \underset{\sim}{q} = \begin{pmatrix} 5 + k + 2 \\ -12 + 3 \end{pmatrix}$

$= \begin{pmatrix} k + 7 \\ -9 \end{pmatrix}$

apabila selari dengan paksi-$y$, $x$=0 ,

$k + 7 = 0$

$k = -7$