CONCEPT MAP

FORM 4

VECTORS

Notation of Vectors

AB, $\overrightarrow{AB}$, $\underset{\sim}{a}$, **a**

Zero Vectors

$\overrightarrow{AB} + \overrightarrow{BA} = \underset{\sim}{0}$

$\overrightarrow{AA} = \underset{\sim}{0}$

Negative Vectors

$-\overrightarrow{AB} = \overrightarrow{BA}$

Equality of Two Vectors

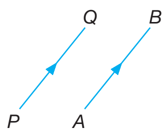
If $p\underset{\sim}{a} + h\underset{\sim}{b} = q\underset{\sim}{a} + k\underset{\sim}{b}$,

then $p = q$ and $h = k$.

Product of Vector $\underset{\sim}{a}$ with scalar $k\underset{\sim}{a}$ is

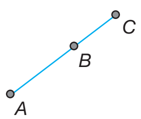
$k\underset{\sim}{a}$ is parallel to $\underset{\sim}{a}$ and in the same direction if k is positive and in the opposite direction if k is negative.

Parallel Condition of Two Vectors



If $\overrightarrow{PQ} = k\overrightarrow{AB}$, then $\overrightarrow{PQ} // \overrightarrow{AB}$

Collinear Condition of Three Points



$\overrightarrow{AB} = k\overrightarrow{BC}$

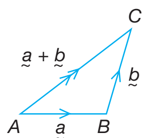
$\overrightarrow{AC} = k\overrightarrow{AB}$

$\overrightarrow{AC} = m\overrightarrow{BC}$

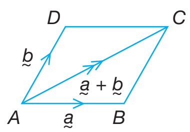
Addition and Subtraction of Vectors

Addition of Two Vectors, $\underset{\sim}{a} + \underset{\sim}{b}$ using:

- Triangle Law of Addition

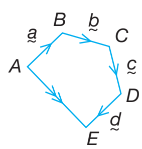


- Parallelogram Law of Addition



Addition of a Few Vectors using:

- Polygon Law of Addition



$\overrightarrow{AE} = \underset{\sim}{a} + \underset{\sim}{b} + \underset{\sim}{c} + \underset{\sim}{d}$

Vectors on a Cartesian Plane

$\overrightarrow{OR} = \underset{\sim}{r} = \begin{pmatrix} x \\ y \end{pmatrix} = x\underset{\sim}{i} + y\underset{\sim}{j}$

Unit Vector of $\underset{\sim}{r}$

$\hat{\underset{\sim}{r}} = \dfrac{\underset{\sim}{r}}{|\underset{\sim}{r}|}$ such that $|\underset{\sim}{r}| = \sqrt{x^2 + y^2}$

Expression of a Vector as the Combination of a few Linear Vectors:

$\underset{\sim}{r} = k\underset{\sim}{a} + p\underset{\sim}{b} + q\underset{\sim}{c}$

$= k\begin{pmatrix} x_1 \\ y_1 \end{pmatrix} + p\begin{pmatrix} x_2 \\ y_2 \end{pmatrix} + q\begin{pmatrix} x_3 \\ y_3 \end{pmatrix}$

$= (kx_1 + px_2 + qx_3)\underset{\sim}{i} + (ky_1 + py_2 + qy_3)\underset{\sim}{j}$