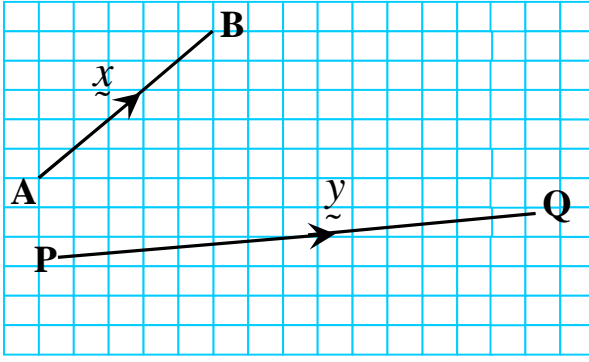
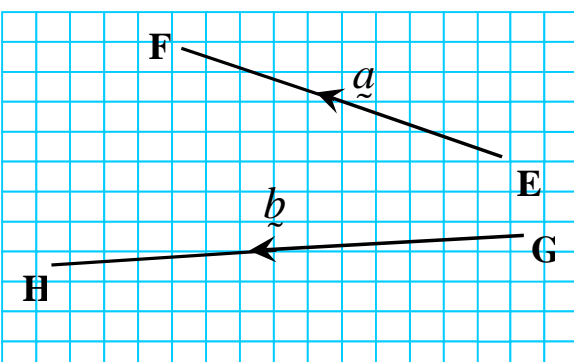
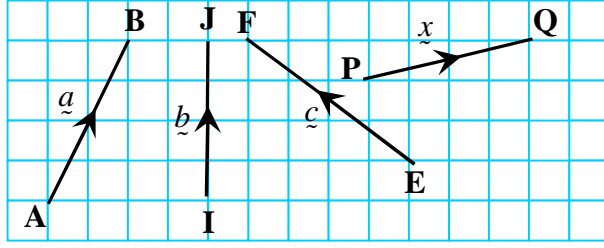


VECTORS

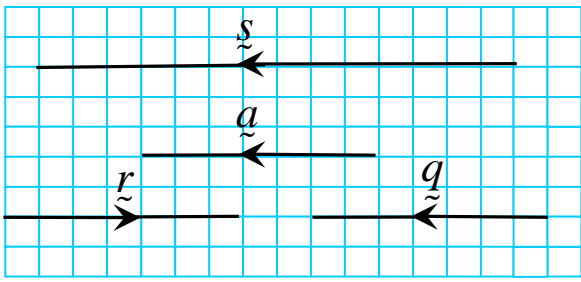
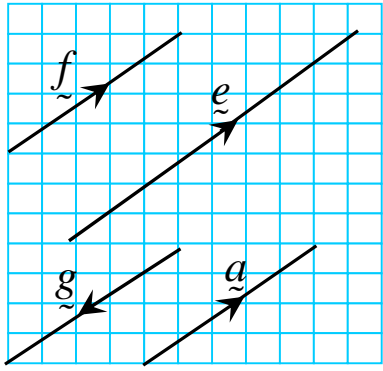
1.1 – 1.4: Introduction to the basic concepts of Vectors

Task 1 : Write down all the vectors as shown in each of the following diagrams.

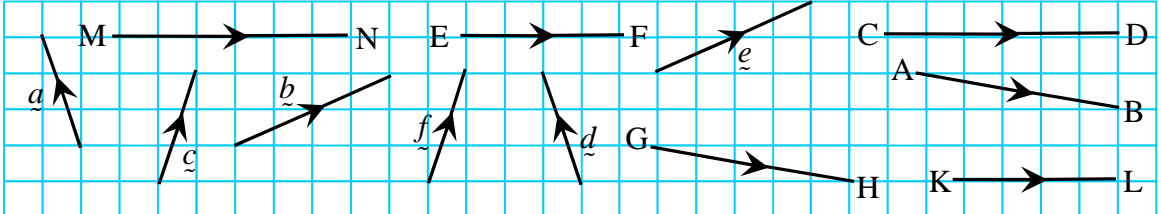
<p>(1)</p>  <p style="text-align: center;">\overline{AB} $y =$</p>	<p>(2)</p>  <p style="text-align: center;">$\overline{GH} =$ $a =$</p>
--	---

<p>(3)</p> 	<p>$\overline{AB} =$ $x =$</p> <p>$\overline{EF} =$ $b =$</p>
---	---

Task 2 : Determine the vectors that are equal in each of the following diagrams.

<p>(1)</p> 	<p>(2)</p> 
--	---

(3)



Task 3 : Determine the negative vectors as shown in the following diagrams.

(1)

$\overline{XY} =$ $\overline{ST} =$ $\overline{CD} =$ $\overline{VW} =$

(2)

The negative vector of \underline{p} :
 $-\underline{p} =$

(3)

The negative vector of \underline{c} :
 $-\underline{c} =$

Answers :

Task 1 :

- (1) $\overline{AB} = \underline{x}$; $\underline{y} = \overline{PQ}$
- (2) $\overline{GH} = \underline{b}$; $\underline{a} = \overline{EF}$
- (3) $\overline{AB} = \underline{a}$; $\underline{x} = \overline{PQ}$; $\overline{EF} = \underline{c}$; $\underline{b} = \overline{IJ}$

Task 2 :

- (1) $\underline{a} = \underline{q}$
- (2) $\underline{a} = \underline{f}$
- (3) $\underline{a} = \underline{d}$; $\underline{b} = \underline{e}$; $\underline{c} = \underline{f}$; $\overline{AB} = \overline{GH}$; $\overline{CD} = \overline{MN}$; $\overline{EF} = \overline{KL}$

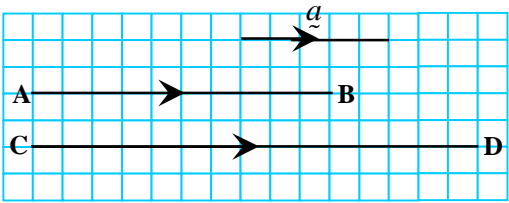
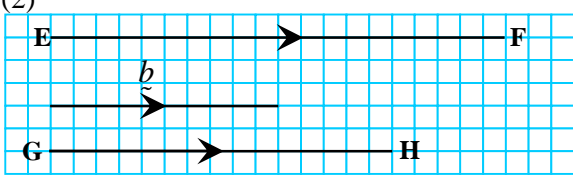
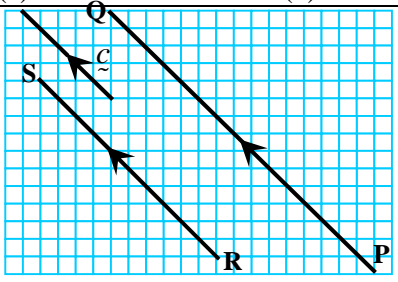
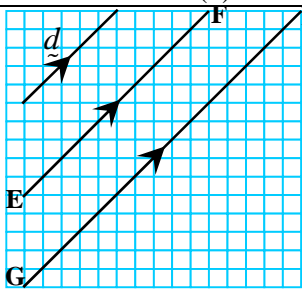
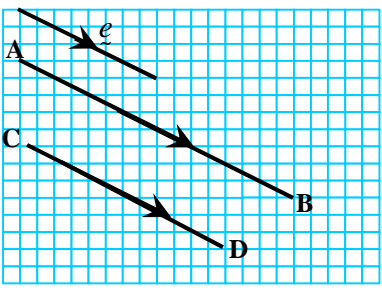
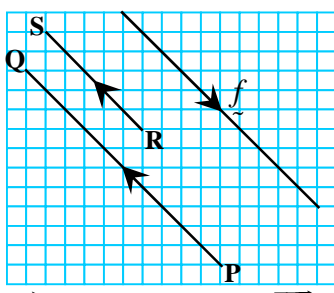
Task 3 :

- (1) $\overline{XY} = -\underline{x}$; $\overline{ST} = -\underline{a}$; $\overline{CD} = -\underline{c}$; $\overline{VW} = -\underline{b}$
- (2) $-\underline{p} = \underline{q}$
- (3) $-\underline{c} = \underline{a}$

VECTORS

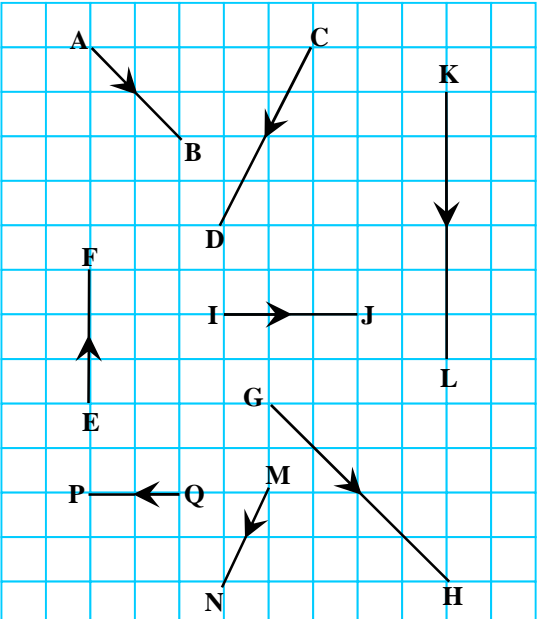
1.5 Multiplication of Vectors by Scalars

Task 1 : State the following vectors in terms of \underline{a} .

<p>(1)</p>  <p>(a) $\overline{AB} =$ (b) $\overline{CD} =$</p>	<p>(2)</p>  <p>(a) $\overline{EF} =$ (b) $\overline{GH} =$</p>
<p>(3)</p>  <p>(a) $\overline{PQ} =$ (b) $\overline{RS} =$</p>	<p>(4)</p>  <p>(a) $\overline{EF} =$ (b) $\overline{GH} =$</p>
<p>(5)</p>  <p>(a) $\overline{AB} =$ (b) $\overline{CD} =$</p>	<p>(6)</p>  <p>(a) $\overline{PQ} =$ (b) $\overline{RS} =$</p>

Answers: (1) (a) $\overline{AB} = 2\underline{a}$ (b) $\overline{CD} = 3\underline{a}$ (2) (a) $\overline{EF} = 2\underline{b}$ (b) $\overline{GH} = \frac{3}{2}\underline{b}$ (3) (a) $\overline{PQ} = 3\underline{c}$ (b) $\overline{RS} = 2\underline{c}$
 (4) (a) $\overline{EF} = 2\underline{d}$ (b) $\overline{GH} = 3\underline{d}$ (5) (a) $\overline{AB} = 2\underline{e}$ (b) $\overline{CD} = \frac{3}{2}\underline{e}$ (6) (a) $\overline{PQ} = -2\underline{f}$ (b) $\overline{RS} = -\frac{1}{2}\underline{f}$

Task 2 : In each diagram below, determine the vectors that are parallel and state their relationships.

	<p>(1) \overline{AB} and _____ are parallel vectors. $\overline{AB} =$</p> <p>(2) \overline{CD} and _____ are parallel vectors. $\overline{CD} =$</p> <p>(3) \overline{EF} and _____ are parallel vectors. $\overline{EF} =$</p> <p>(4) \overline{IJ} and _____ are parallel vectors. $\overline{IJ} =$</p>
---	---

Answers : (1) \overline{GH} ; $\overline{AB} = \frac{1}{2}\overline{GH}$ (2) \overline{MN} ; $\overline{CD} = 2\overline{MN}$ (3) \overline{KL} ; $\overline{EF} = -\frac{1}{2}\overline{KL}$ (4) \overline{QP} ; $\overline{IJ} = -\frac{3}{2}\overline{QP}$

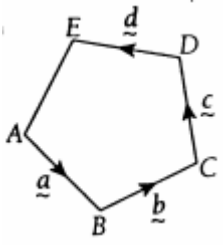
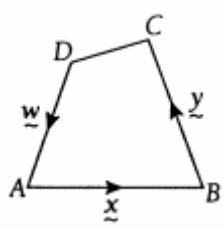
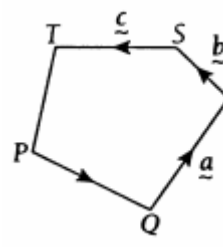
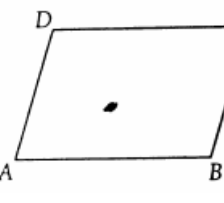
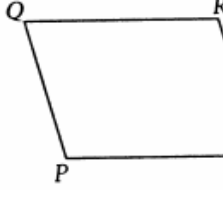
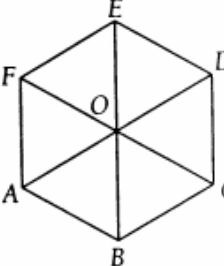
VECTORS

2.1 – 2.4 Addition and Subtraction of Vectors.

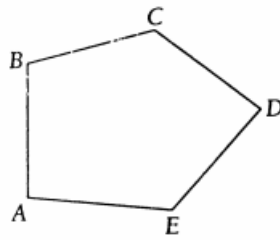
Task 1 : Determine the resultant vector of two or more parallel vectors by addition and subtraction operations.

(1) $2\vec{a} + \vec{a} + \frac{1}{2}\vec{a}$ $\frac{7}{2}\vec{a}$	(2) $\frac{1}{2}\vec{x} + 2\vec{x} + \frac{1}{3}\vec{x}$ $\frac{17}{6}\vec{x}$	(3) $5\vec{y} + \frac{1}{2}\vec{y} + \frac{3}{4}\vec{y}$ $\frac{25}{4}\vec{y}$
(4) $5\vec{b} - 3\vec{b}$ $2\vec{b}$	(5) $7\vec{a} - 3\vec{a} - \frac{1}{2}\vec{a}$ $\frac{7}{2}\vec{a}$	(6) $12\vec{b} - 2\vec{b} - 5\vec{b}$ $5\vec{b}$
(7) $2\vec{a} + \frac{1}{3}\vec{b} + \frac{1}{2}\vec{a} + \vec{b}$ $\frac{5}{2}\vec{a} + \frac{4}{3}\vec{b}$	(8) $\vec{a} + 2\vec{b} + 3\vec{a} + \frac{1}{4}\vec{b}$ $4\vec{a} + \frac{9}{4}\vec{b}$	(9) $4\vec{u} + \frac{1}{2}\vec{v} + \frac{1}{5}\vec{u} + \frac{1}{6}\vec{v}$ $\frac{21}{5}\vec{u} + \frac{2}{3}\vec{v}$
(10) $6\vec{x} - 4\vec{y} - \vec{x} + 2\vec{y}$ $5\vec{x} - 2\vec{y}$	(11) $4\vec{u} + 5\vec{v} - 2\vec{u} - 3\vec{v}$ $2\vec{u} + 2\vec{v}$	(12) $6\vec{s} - 8\vec{t} - 9\vec{s} - 2\vec{t}$ $-3\vec{s} - 10\vec{t}$

Task 2 : Determine the resultant vector of two or more non-parallel vectors by addition and subtraction operations.

(1)  <p>(a) $\vec{a} + \vec{b} =$ (b) $\vec{b} + \vec{c} =$ (c) $\vec{c} + \vec{d} =$ (d) $\vec{AB} + \vec{BD} =$</p>	(2)  <p>(a) $\vec{x} + \vec{y} =$ (b) $\vec{w} + \vec{z} =$ (c) $\vec{DC} + \vec{CB} =$ (d) $\vec{BC} + \vec{CA} =$</p>
(3)  <p>(a) $\vec{a} + \vec{b} =$ (b) $\vec{b} + \vec{c} =$ (c) $\vec{QP} + \vec{PT} =$ (d) $\vec{RT} + \vec{TQ} =$</p>	(4) ABCD in the diagram is a parallelogram.  <p>(a) $\vec{AB} + \vec{AD} =$ (b) $\vec{BA} + \vec{BC} =$ (c) $\vec{DA} + \vec{DC} =$ (d) $\vec{CB} + \vec{CD} =$</p>
(5) PQRS in the diagram is a parallelogram.  <p>(a) $\vec{PQ} + \vec{PS} =$ (b) $\vec{SP} + \vec{SR} =$ (c) $\vec{QP} + \vec{QR} =$ (d) $\vec{RQ} + \vec{RS} =$</p>	(6) ABCDEF in the diagram is a regular Hexagon  <p>(a) $\vec{AB} + \vec{AF} =$ (b) $\vec{OC} + \vec{OE} =$ (c) $\vec{FA} + \vec{FE} =$ (d) $\vec{CB} + \vec{CD} =$</p>

(7) ABCDE in the diagram is a pentagon.



(a) $\overline{AB} + \overline{BC} + \overline{CD}$

=

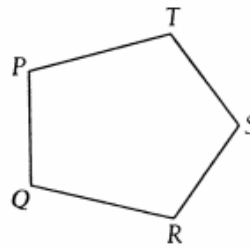
(b) $\overline{AC} + \overline{CD} + \overline{DE}$

=

(c) $\overline{CD} + \overline{DA} + \overline{AE}$

=

(8) PQRST in the diagram is a pentagon.



(a) $\overline{PQ} + \overline{QR} + \overline{RT}$

=

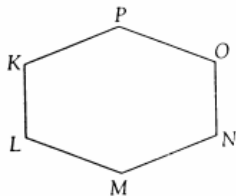
(b) $\overline{RS} + \overline{ST} + \overline{TQ}$

=

(c) $\overline{TP} + \overline{PR} + \overline{RQ}$

=

(9) KLMNOP in the diagram is a hexagon.



(a) $\overline{PO} + \overline{ON} + \overline{NM} + \overline{ML}$

=

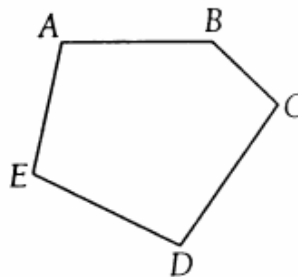
(b) $\overline{KM} + \overline{MN} + \overline{NP} + \overline{PK}$

=

(c) $\overline{MN} + \overline{NL} + \overline{LP} + \overline{PN}$

=

(10) ABCDE in the diagram is a pentagon.



(a) $\overline{AD} - \overline{CD}$

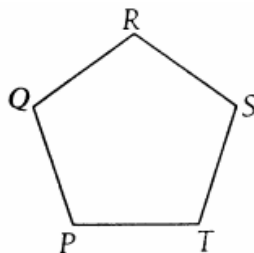
=

(b) $\overline{CB} - \overline{EB}$

=

=

(11) PQRST in the diagram is a pentagon.

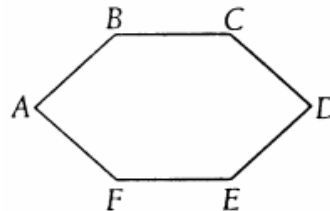


(a) $\overline{PS} - \overline{TS}$

(b) $\overline{RQ} - \overline{PQ}$

(c) $\overline{SP} - \overline{TP}$

(12) ABCDEF in the diagram is a hexagon.



(a) $\overline{AD} - \overline{DC}$

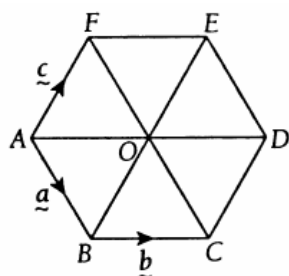
=

=

(b) $\overline{BC} - \overline{DC} - \overline{ED} =$

(c) $\overline{CA} - \overline{FA} - \overline{EF} =$

(13) ABCDEF in the diagram is a regular hexagon with centre O.



(a) $\underline{a} - \underline{b} =$

(b) $\underline{b} - 2\underline{a} =$

(c) $\underline{b} - \underline{c} =$

(d) $\underline{a} - 2\underline{b} =$

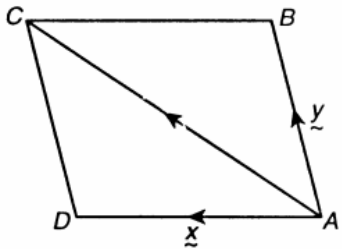
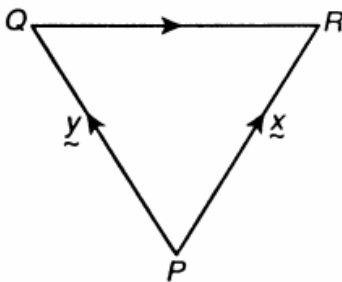
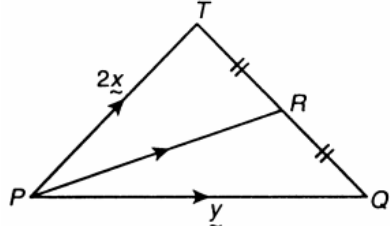
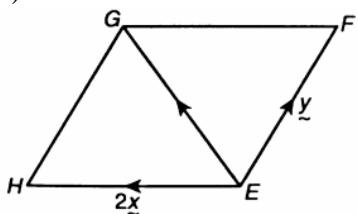
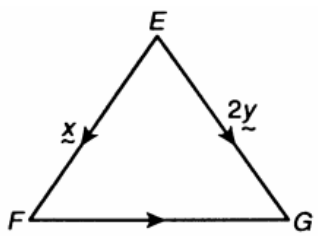
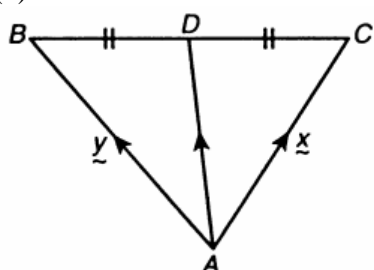
(e) $\underline{a} - \underline{c} =$

(f) $\underline{c} - 2\underline{b} =$

VECTORS

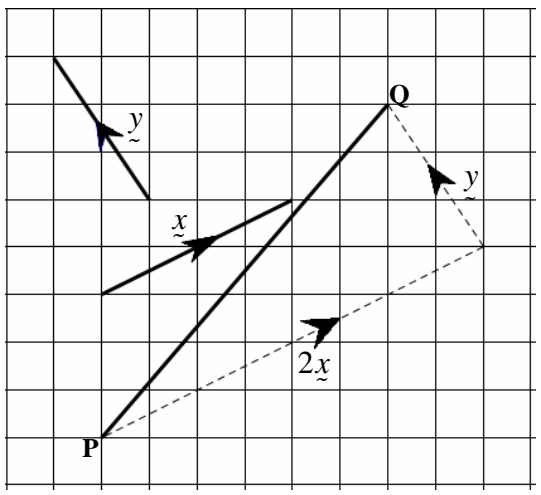
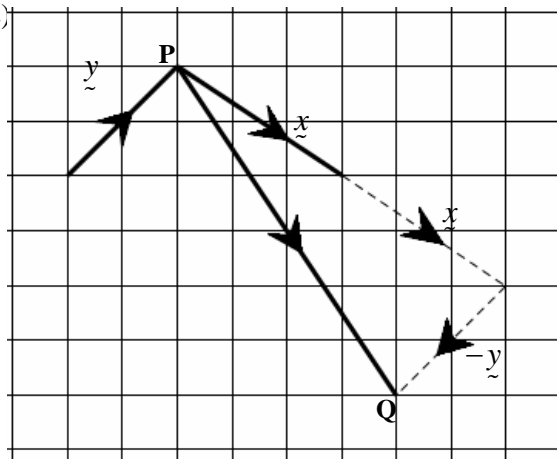
2.5 Represent Vectors as Linear Combination of other Vectors.

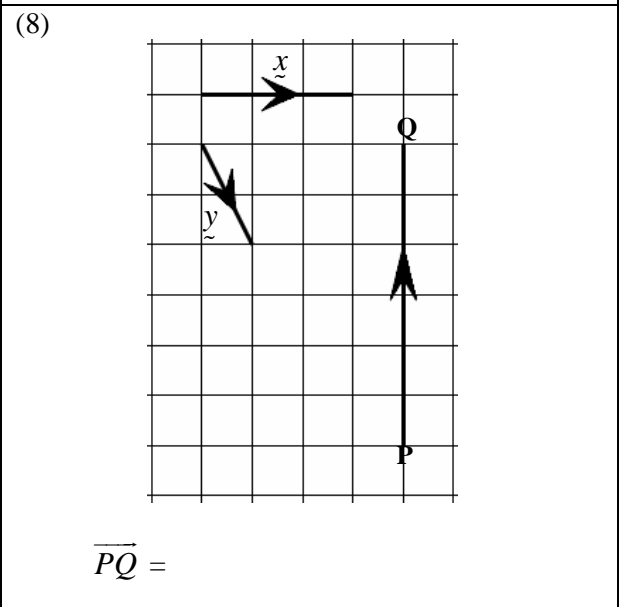
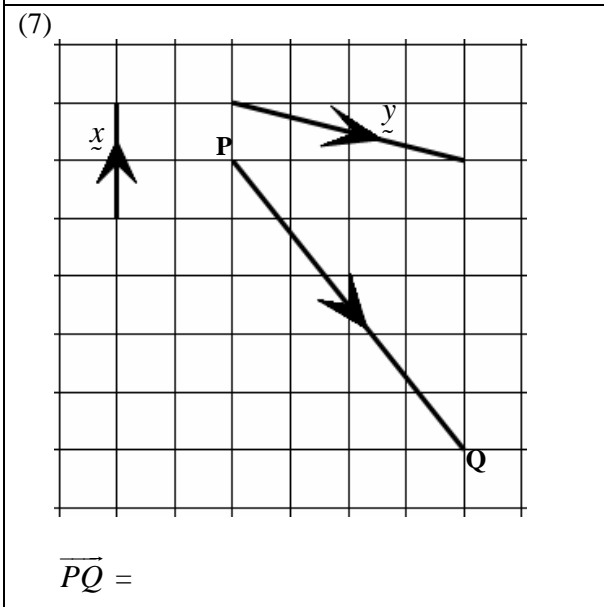
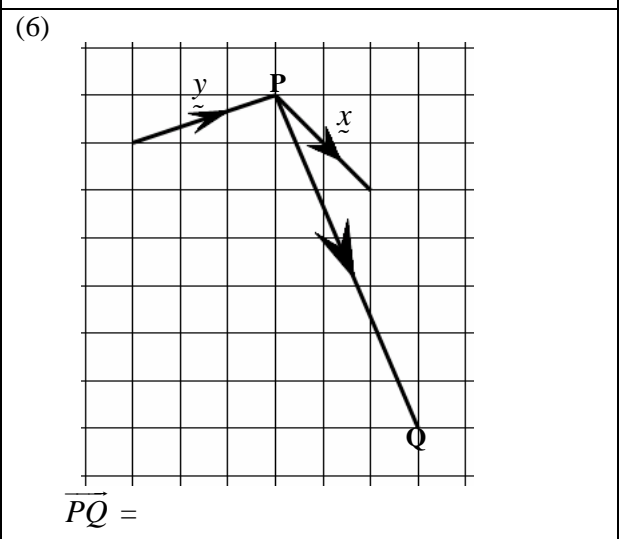
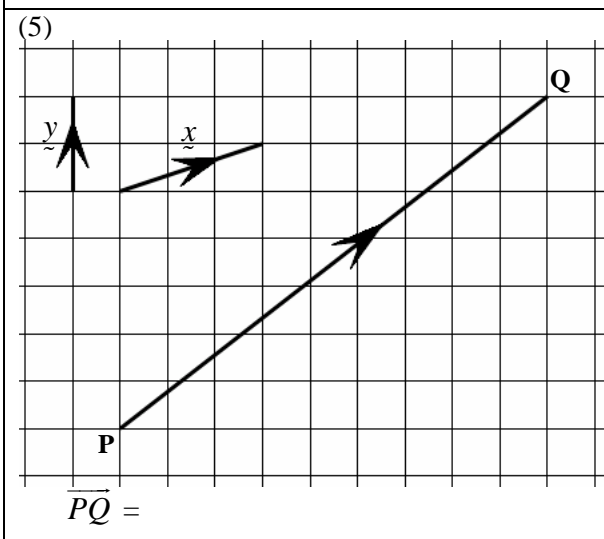
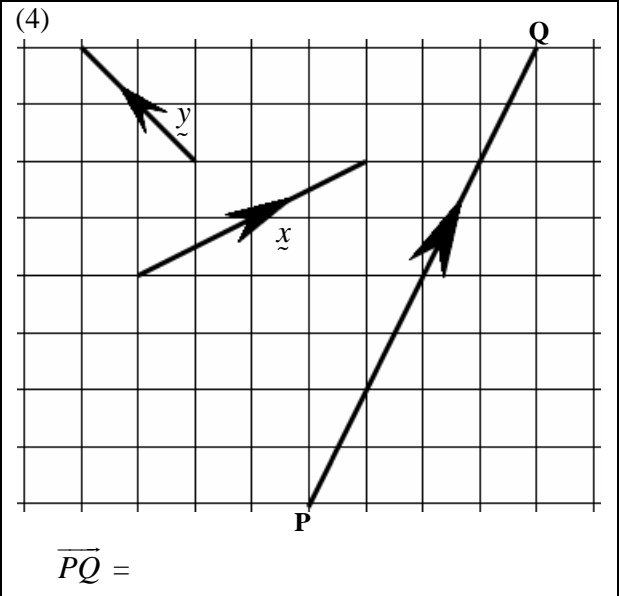
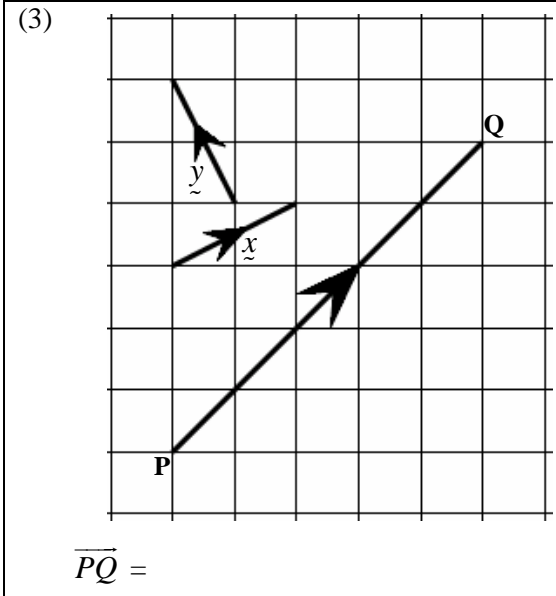
Task 1 : Express the following vectors in terms of \underline{x} and \underline{y} .

<p>(1)</p>  <p>ABCD is a parallelogram.</p> <p>$\overline{AC} =$</p>	<p>(2)</p>  <p>$\overline{QR} =$</p>	<p>(3)</p>  <p>$\overline{TQ} =$</p> <p>$\overline{PR} =$</p>
<p>(4)</p>  <p>EFGH is a parallelogram.</p> <p>$\overline{EG} =$</p>	<p>(5)</p>  <p>$\overline{FG} =$</p>	<p>(6)</p>  <p>$\overline{BC} =$</p> <p>$\overline{AD} =$</p>

Answers : (1) $\overline{AC} = \underline{x} + \underline{y}$ (2) $\overline{QR} = -\underline{y} + \underline{x}$ (3) $\overline{TQ} = -2\underline{x} + \underline{y}$; $\overline{PR} = \underline{x} + \frac{1}{2}\underline{y}$
 (4) $\overline{EG} = 2\underline{x} + \underline{y}$ (5) $\overline{FG} = -\underline{x} + 2\underline{y}$ (6) $\overline{BC} = -\underline{y} + \underline{x}$; $\overline{AD} = \frac{1}{2}\underline{y} + \frac{1}{2}\underline{x}$

Task 2 : For each of the following diagrams, express the vector \overline{PQ} in terms of \underline{x} and \underline{y} .

<p>(1)</p>  <p>$\overline{PQ} =$</p>	<p>(2)</p>  <p>$\overline{PQ} =$</p>
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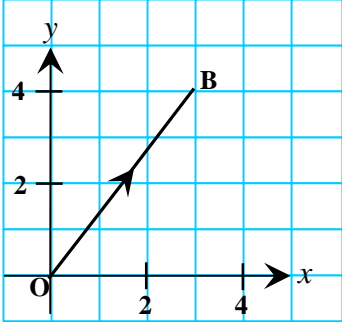
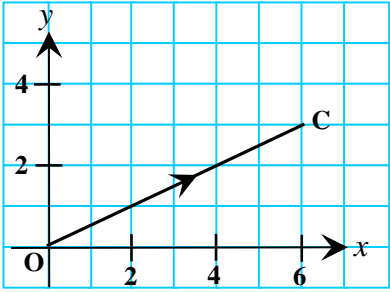
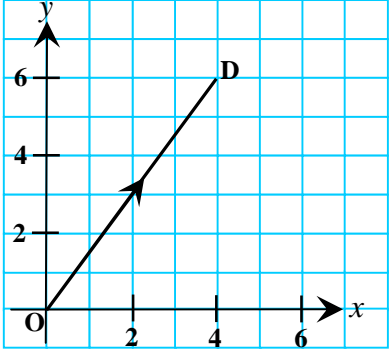
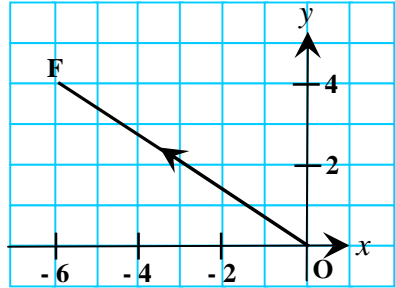
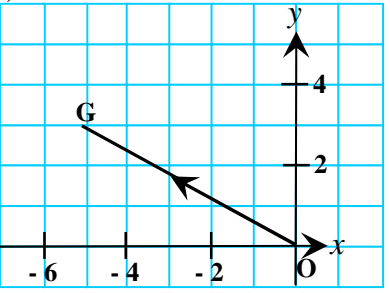
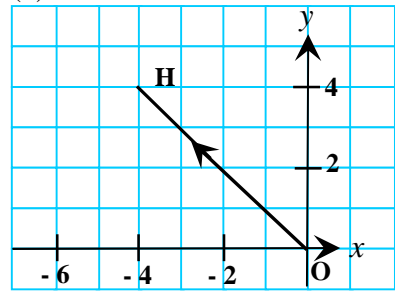
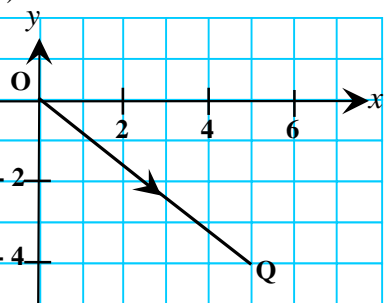
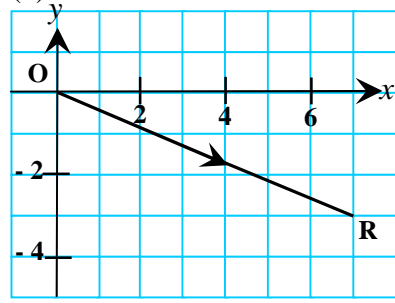


Answers : (1) $\overline{PQ} = 2\tilde{x} + \tilde{y}$ (2) $\overline{PQ} = \tilde{x} - \tilde{y}$ (3) $\overline{PQ} = 3\tilde{x} + \tilde{y}$ (4) $\overline{PQ} = 2\tilde{x} + 2\tilde{y}$
 (5) $\overline{PQ} = 3\tilde{x} + 2\tilde{y}$ (6) $\overline{PQ} = 2\tilde{x} - \tilde{y}$ (7) $\overline{PQ} = -2\tilde{x} + \tilde{y}$ (8) $\overline{PQ} = \tilde{x} - 3\tilde{y}$

VECTORS

3.1 Express Vectors in Cartesian Plane in the form of $x\mathbf{i} + y\mathbf{j}$ or $\begin{pmatrix} x \\ y \end{pmatrix}$.

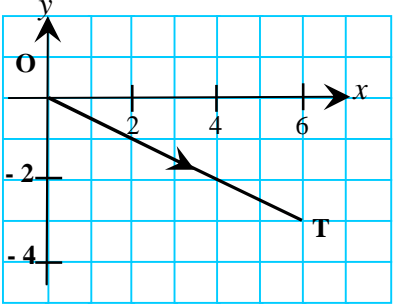
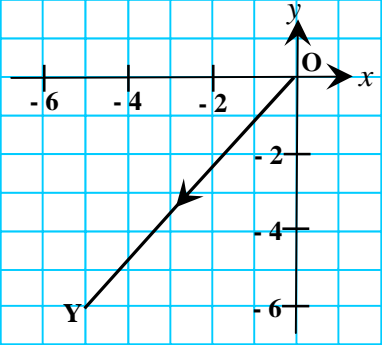
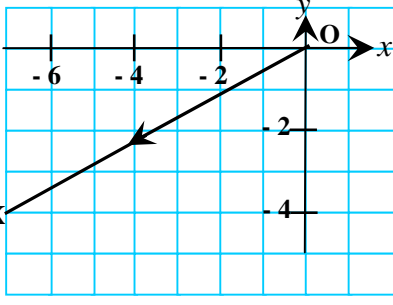
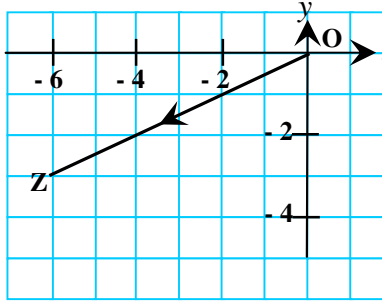
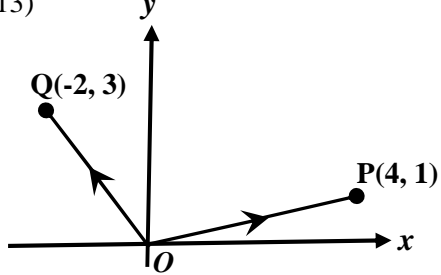
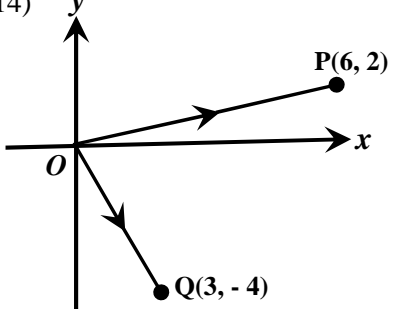
Task : Express the following vectors in the form of $x\mathbf{i} + y\mathbf{j}$ or $\begin{pmatrix} x \\ y \end{pmatrix}$.

<p>(1)</p>  <p>$B(\quad , \quad)$</p> <p>$\overline{OB} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$</p> <p>$\overline{OB} =$</p>	<p>(2)</p>  <p>$C(\quad , \quad)$</p> <p>$\overline{OC} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$</p> <p>$\overline{OC} =$</p>
<p>(3)</p>  <p>$D(\quad , \quad)$</p> <p>$\overline{OD} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$</p> <p>$\overline{OD} =$</p>	<p>(4)</p>  <p>$F(\quad , \quad)$</p> <p>$\overline{OF} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$</p> <p>$\overline{OF} =$</p>
<p>(5)</p>  <p>$G(\quad , \quad)$</p> <p>$\overline{OG} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$</p> <p>$\overline{OG} =$</p>	<p>(6)</p>  <p>$H(\quad , \quad)$</p> <p>$\overline{OH} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$</p> <p>$\overline{OH} =$</p>
<p>(7)</p>  <p>$Q(\quad , \quad)$</p> <p>$\overline{OQ} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$</p> <p>$\overline{OQ} =$</p>	<p>(8)</p>  <p>$R(\quad , \quad)$</p> <p>$\overline{OR} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$</p> <p>$\overline{OR} =$</p>

Answers : (1) $(3, 4)$; $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$; $3\mathbf{i} + 4\mathbf{j}$ (2) $(6, 3)$; $\begin{pmatrix} 6 \\ 3 \end{pmatrix}$; $6\mathbf{i} + 3\mathbf{j}$ (3) $(4, 6)$; $\begin{pmatrix} 4 \\ 6 \end{pmatrix}$; $4\mathbf{i} + 6\mathbf{j}$

(4) $(-6, 4)$; $\begin{pmatrix} -6 \\ 4 \end{pmatrix}$; $-6\mathbf{i} + 4\mathbf{j}$ (5) $(-5, 3)$; $\begin{pmatrix} -5 \\ 3 \end{pmatrix}$; $-5\mathbf{i} + 3\mathbf{j}$ (6) $(-4, 4)$; $\begin{pmatrix} -4 \\ 4 \end{pmatrix}$; $-4\mathbf{i} + 4\mathbf{j}$

(7) $(5, -4)$; $\begin{pmatrix} 5 \\ -4 \end{pmatrix}$; $5\mathbf{i} - 4\mathbf{j}$ (8) $(7, -3)$; $\begin{pmatrix} 7 \\ -3 \end{pmatrix}$; $7\mathbf{i} - 3\mathbf{j}$

<p>(9)</p>  <p>$T(\quad , \quad)$</p> <p>$\overrightarrow{OT} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$</p> <p>$\overrightarrow{OT} =$</p>	<p>(10)</p>  <p>$Y(\quad , \quad)$</p> <p>$\overrightarrow{OY} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$</p> <p>$\overrightarrow{OY} =$</p>
<p>(11)</p>  <p>$X(\quad , \quad)$</p> <p>$\overrightarrow{OX} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$</p> <p>$\overrightarrow{OX} =$</p>	<p>(12)</p>  <p>$Z(\quad , \quad)$</p> <p>$\overrightarrow{OZ} = \begin{pmatrix} \quad \\ \quad \end{pmatrix}$</p> <p>$\overrightarrow{OZ} =$</p>
<p>(13)</p>  <p>$\overrightarrow{OP} = \begin{pmatrix} \quad \\ \quad \end{pmatrix} =$</p> <p>$\overrightarrow{OQ} = \begin{pmatrix} \quad \\ \quad \end{pmatrix} =$</p>	<p>(14)</p>  <p>$\overrightarrow{OP} = \begin{pmatrix} \quad \\ \quad \end{pmatrix} =$</p> <p>$\overrightarrow{OQ} = \begin{pmatrix} \quad \\ \quad \end{pmatrix} =$</p>
<p>(15) $O(0, 0)$, $A(1, 4)$ and $B(-5, 2)$.</p> <p>$\overrightarrow{OA} = \begin{pmatrix} \quad \\ \quad \end{pmatrix} =$</p> <p>$\overrightarrow{OB} = \begin{pmatrix} \quad \\ \quad \end{pmatrix} =$</p>	<p>(16) $O(0, 0)$, $A(4, -8)$ and $B(-3, -6)$.</p> <p>$\overrightarrow{OA} = \begin{pmatrix} \quad \\ \quad \end{pmatrix} =$</p> <p>$\overrightarrow{OB} = \begin{pmatrix} \quad \\ \quad \end{pmatrix} =$</p>

Answers : (9) $(6, -3)$; $\begin{pmatrix} 6 \\ -3 \end{pmatrix}$; $6\mathbf{i} - 3\mathbf{j}$ (10) $(-5, -6)$; $\begin{pmatrix} -5 \\ -6 \end{pmatrix}$; $-5\mathbf{i} - 6\mathbf{j}$ (11) $(-7, -4)$; $\begin{pmatrix} -7 \\ -4 \end{pmatrix}$; $-7\mathbf{i} - 4\mathbf{j}$ (12) $(-6, -3)$; $\begin{pmatrix} -6 \\ -3 \end{pmatrix}$; $-6\mathbf{i} - 3\mathbf{j}$ (13) $\begin{pmatrix} 4 \\ 1 \end{pmatrix} = 4\mathbf{i} + \mathbf{j}$; $\begin{pmatrix} -2 \\ 3 \end{pmatrix} = -2\mathbf{i} + 3\mathbf{j}$ (14) $\begin{pmatrix} 6 \\ 2 \end{pmatrix} = 6\mathbf{i} + 2\mathbf{j}$; $\begin{pmatrix} 3 \\ -4 \end{pmatrix} = 3\mathbf{i} - 4\mathbf{j}$ (15) $\begin{pmatrix} 1 \\ 4 \end{pmatrix} = \mathbf{i} + 4\mathbf{j}$; $\begin{pmatrix} -5 \\ 2 \end{pmatrix} = -5\mathbf{i} + 2\mathbf{j}$ (16) $\begin{pmatrix} 4 \\ -8 \end{pmatrix} = 4\mathbf{i} - 8\mathbf{j}$; $\begin{pmatrix} -3 \\ -6 \end{pmatrix} = -3\mathbf{i} - 6\mathbf{j}$

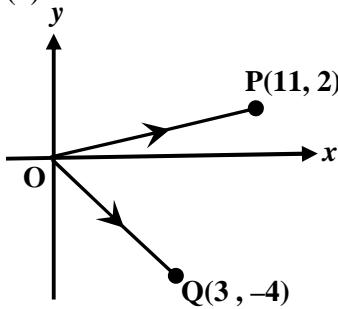
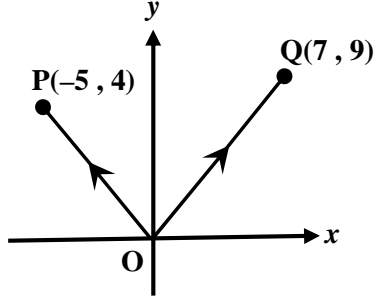
VECTORS

3.4 – 3.7 Addition, Subtraction and Multiplication of Vectors

Task 1 : Given $\underline{a} = 2\underline{i} + 5\underline{j}$, $\underline{b} = \underline{i} - 4\underline{j}$ and $\underline{c} = -3\underline{i} + 7\underline{j}$, find the following vectors in terms of \underline{i} and \underline{j} .

(1) $2\underline{b}$ = $2\underline{i} - 8\underline{j}$	(2) $3\underline{a}$ = $6\underline{i} + 15\underline{j}$	(3) $4\underline{c}$ = $-12\underline{i} + 28\underline{j}$
(4) $\frac{1}{2}\underline{a}$ = $\underline{i} + \frac{5}{2}\underline{j}$	(5) $\underline{a} + 3\underline{b}$ = $5\underline{i} - 7\underline{j}$	(6) $2\underline{a} + \underline{b}$ = $5\underline{i} + 6\underline{j}$
(7) $\underline{b} + \underline{c}$ = $-2\underline{i} - 3\underline{j}$	(8) $\frac{1}{2}\underline{b} + \underline{a}$ = $\frac{5}{2}\underline{i} + 3\underline{j}$	(9) $\underline{a} - 3\underline{b}$ = $-\underline{i} + 17\underline{j}$
(10) $4\underline{b} - \underline{c}$ = $7\underline{i} - 23\underline{j}$	(11) $3\underline{c} - 2\underline{a}$ = $-13\underline{i} + 11\underline{j}$	(12) $\underline{b} - \frac{1}{2}\underline{a}$ = $-\frac{13}{2}\underline{j}$

Task 3 : Write vector \overrightarrow{PQ} in the form $\begin{pmatrix} x \\ y \end{pmatrix}$ and determine its magnitude. Hence, find the unit vector in the direction of vector \overrightarrow{PQ} .

<p>(1)</p>  <p style="text-align: center;">$P(11, 2)$ $Q(3, -4)$</p> <p>$\begin{pmatrix} -8 \\ -6 \end{pmatrix}; 10; \begin{pmatrix} -\frac{4}{5} \\ -\frac{3}{5} \end{pmatrix}$</p>	<p>(2)</p>  <p style="text-align: center;">$P(-5, 4)$ $Q(7, 9)$</p> <p>$\begin{pmatrix} 12 \\ 5 \end{pmatrix}; 13; \begin{pmatrix} \frac{12}{13} \\ \frac{5}{13} \end{pmatrix}$</p>
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Task 4 : Write vector \overrightarrow{AB} in terms of \underline{i} and \underline{j} and find its magnitude. Hence, find the unit vector in the direction of vector \overrightarrow{AB} .

<p>(1) $O(0, 0)$, $A(4, -30)$ and $B(-3, -6)$.</p> <p style="text-align: center;">$-7\underline{i} + 24\underline{j}; 25; -\frac{7}{25}\underline{i} + \frac{24}{25}\underline{j}$</p>	<p>(2) $O(0, 0)$, $A(-5, 2)$ and $B(3, -4)$.</p> <p style="text-align: center;">$8\underline{i} - 6\underline{j}; 10; \frac{4}{5}\underline{i} - \frac{3}{5}\underline{j}$</p>
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Task 5 : Given $\underline{a} = 3\underline{i} + 4\underline{j}$, $\underline{b} = 2\underline{i} - \underline{j}$ and $\underline{c} = -\underline{i} + 5\underline{j}$, find in terms of \underline{i} and \underline{j} , the unit vector in the direction of the vectors below.

<p>(1) $2\underline{a} - \underline{b} - \underline{c}$</p> <p style="text-align: center;">$5\underline{i} + 4\underline{j}; \sqrt{41}; \frac{5}{\sqrt{41}}\underline{i} + \frac{4}{\sqrt{41}}\underline{j}$</p>	<p>(2) $3\underline{a} - 2\underline{b} + \underline{c}$</p> <p style="text-align: center;">$4\underline{i} + 19\underline{j}; \sqrt{377}; \frac{4}{\sqrt{377}}\underline{i} + \frac{19}{\sqrt{377}}\underline{j}$</p>
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