

Penyelesaian Lengkap

Praktis 8

Praktis Formatif

1 $2m + 3 = 0$

$$m = -\frac{3}{2}$$

$$5 - n = 0$$

$$n = 5$$

2 $\vec{RS} = \frac{15}{40}\vec{RT}$

$$\vec{RS} = \frac{3}{8}\vec{RT}$$

$$\vec{RS} = \frac{3}{5}\vec{ST}$$

3 (a) $\vec{AB} = \lambda\vec{BC}$

$$9\vec{p} - 12\vec{q} = \lambda[6\vec{p} + (5 - m)\vec{q}]$$

$$9\vec{p} - 12\vec{q} = 6\lambda\vec{p} + \lambda(5 - m)\vec{q}$$

Bandungkan/Compare \vec{p} : $6\lambda = 9$

$$\lambda = \frac{3}{2}$$

Bandungkan/Compare \vec{q} : $\frac{3}{2}(5 - m) = -12$

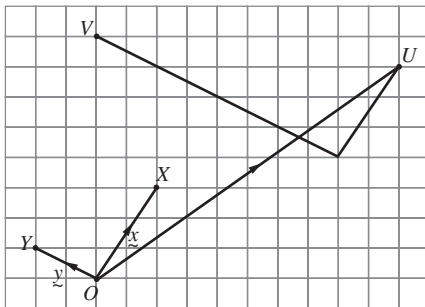
$$5 - m = -8$$

$$m = 13$$

(b) $\vec{AB} = \frac{3}{2}\vec{BC}$

$$AB : BC = 3 : 2$$

4 (a) & (b)



5 $\vec{c} = 4\vec{a} - 2\vec{b}$
 $= 4(3\vec{p} + 4\vec{q}) - 2(2\vec{p} - \vec{q})$
 $= 8\vec{p} + 18\vec{q}$
 $= m\vec{p} + (m - n)\vec{q}$

Bandungkan/Compare \vec{p} : $m = 8$

Bandungkan/Compare \vec{q} : $8 - n = 18$
 $n = -10$

6 (a) $\vec{PR} = 4\vec{r} - \vec{p}$

(b) $\vec{RQ} = -4\vec{r} + \vec{p} + 3\vec{r}$

$$\vec{RQ} = \vec{p} - \vec{r}$$

7 (a) $\vec{RQ} = -\vec{r} + \vec{q}$

(b) $\vec{OS} = \vec{OR} + \vec{RT} + \vec{TS}$

$$= \vec{r} - \vec{q} + \frac{1}{2}\vec{r}$$

$$= \frac{3}{2}\vec{r} - \vec{q}$$

8 $\vec{RQ} = \vec{RS} + \vec{SP} + \vec{PQ}$

$$= k\vec{a} + h\vec{b} + h\vec{a}$$

$$= (k + h)\vec{a} + h\vec{b}$$

$$= 2\vec{a} + (k + 8)\vec{b}$$

Bandungkan/Compare \vec{a} : $k + h = 2 \dots \textcircled{1}$

Bandungkan/Compare \vec{b} : $h = k + 8 \dots \textcircled{2}$

Gantikan $\textcircled{2}$ ke dalam $\textcircled{1}$ /Substitute $\textcircled{2}$ into $\textcircled{1}$,

$$k + k + 8 = 2$$

$$2k = -8$$

$$k = -4$$

Gantikan ke dalam $\textcircled{2}$ /Substitute into $\textcircled{2}$,

$$h = -4 + 8$$

$$= 4$$

9 (a) $\vec{BD} = 6\vec{q} - 10\vec{p}$

(b) $\vec{ED} = \frac{1}{4}(6\vec{q} - 10\vec{p})$

$$= \frac{3}{2}\vec{q} - \frac{5}{2}\vec{p}$$

$$\vec{EC} = \vec{ED} + \vec{DC}$$

$$= \frac{3}{2}\vec{q} - \frac{5}{2}\vec{p} + 10\vec{p} = \frac{3}{2}\vec{q} + \frac{15}{2}\vec{p}$$

10 (a) $\vec{OD} = \vec{OB} + \vec{BD}$

$$= \vec{OB} + \frac{1}{2}\vec{BA}$$

$$= \vec{b} + \frac{1}{2}(\vec{a} - \vec{b})$$

$$= \frac{1}{2}\vec{a} + \frac{1}{2}\vec{b}$$

(b) $\vec{CE} = \vec{CO} + \vec{OE}$

$$\vec{CE} = -\frac{1}{3}\vec{a} + \frac{2}{3}\vec{OD}$$

$$\vec{CE} = -\frac{1}{3}\vec{a} + \frac{2}{3}\left(\frac{1}{2}\vec{a} + \frac{1}{2}\vec{b}\right)$$

$$= -\frac{1}{3}\vec{a} + \frac{1}{3}\vec{a} + \frac{1}{3}\vec{b}$$

$$= \frac{1}{3}\vec{b}$$

$$\vec{CE} = \frac{1}{3}\vec{OB}$$

$$\frac{CE}{OB} = \frac{1}{3}$$

$$CE : OB = 1 : 3$$

$$11 \text{ (a) (i) } \vec{PQ} = \vec{OQ} - \vec{OP}$$

$$= 5\hat{x} + 8\hat{y} - (-5\hat{x} + 10\hat{y})$$

$$= 10\hat{x} - 2\hat{y}$$

$$(ii) \vec{PR} = \vec{OR} - \vec{OP}$$

$$= (m-1)\hat{x} + 7\hat{y} - (-5\hat{x} + 10\hat{y})$$

$$= (m-1+5)\hat{x} - 3\hat{y}$$

$$= (m+4)\hat{x} - 3\hat{y}$$

$$(b) \vec{PQ} = \lambda \vec{PR}$$

$$10\hat{x} - 2\hat{y} = \lambda[(m+4)\hat{x} - 3\hat{y}]$$

$$= \lambda(m+4)\hat{x} - 3\lambda\hat{y}$$

$$\text{Bandingkan/Compare } x: 10 = \lambda(m+4) \dots \textcircled{1}$$

$$\text{Bandingkan/Compare } y: -2 = -3\lambda$$

$$\lambda = \frac{2}{3}$$

Gantikan ke dalam $\textcircled{1}$ /Substitute into $\textcircled{1}$,

$$10 = \frac{2}{3}(m+4)$$

$$30 = 2m + 8$$

$$2m = 22$$

$$m = 11$$

$$12 \text{ (a) } \vec{BD} = \vec{BA} + \vec{AD} \text{ atau/or } \vec{BC} - \vec{DC}$$

$$= -(3\hat{i} + 2\hat{j}) + 7\hat{i} - 6\hat{j}$$

$$\vec{BD} = 4\hat{i} - 8\hat{j}$$

$$\vec{ED} = \frac{1}{2}(4\hat{i} - 8\hat{j})$$

$$\vec{ED} = 2\hat{i} - 4\hat{j}$$

$$(b) \vec{EC} = 2\hat{i} - 4\hat{j} + 3\hat{i} + 2\hat{j}$$

$$\vec{EC} = 5\hat{i} - 2\hat{j}$$

$$|\vec{EC}| = \sqrt{5^2 + (-2)^2}$$

$$= \sqrt{29} \text{ unit/units}$$

$$13 \text{ (a) } \vec{AB} = \vec{OB} - \vec{OA}$$

$$= \begin{pmatrix} 5 \\ 3 \end{pmatrix} - \begin{pmatrix} 2 \\ -1 \end{pmatrix} \text{ atau/or } \begin{pmatrix} -2 \\ 1 \end{pmatrix} + \begin{pmatrix} 5 \\ 3 \end{pmatrix}$$

$$\vec{AB} = \begin{pmatrix} 3 \\ 4 \end{pmatrix}$$

$$(b) |\vec{AB}| = \sqrt{3^2 + 4^2}$$

$$= 5$$

$$\text{Vektor unit/Unit vector } \vec{AB} = \frac{1}{5} \begin{pmatrix} 3 \\ 4 \end{pmatrix}$$

$$14 \vec{MN} = \begin{pmatrix} 3 \\ 4 \end{pmatrix} - \begin{pmatrix} -5 \\ k \end{pmatrix}$$

$$= \begin{pmatrix} 8 \\ 4-k \end{pmatrix}$$

$$\sqrt{8^2 + (4-k)^2} = 10$$

$$(4-k)^2 = 36$$

$$4-k = -6,$$

$$k = 10$$

$$4-k = 6$$

$$k = -2$$

$$15 \vec{a} - \vec{b} = -7\hat{i} - m\hat{j} - (8\hat{i} - \hat{j})$$

$$= -15\hat{i} + (1-m)\hat{j}$$

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

$$-15\hat{i} + (1-m)\hat{j} = \lambda(-10\hat{i} + 6\hat{j})$$

$$-15\hat{i} + (1-m)\hat{j} = -10\lambda\hat{i} + 6\lambda\hat{j}$$

$$\text{Bandingkan/Compare } i: -15 = -10\lambda$$

$$\lambda = \frac{3}{2}$$

$$\text{Bandingkan/Compare } j: 1-m = 6\lambda$$

$$1-m = 6\left(\frac{3}{2}\right)$$

$$1-m = 9$$

$$m = -8$$

$$16 \vec{OB} - \vec{OA} - 2[\vec{OC} - \vec{OB}] = \begin{pmatrix} 9 \\ -5 \end{pmatrix}$$

$$\begin{pmatrix} 3 \\ 4 \end{pmatrix} - \begin{pmatrix} 2 \\ -5 \end{pmatrix} - 2\left[\begin{pmatrix} p \\ q \end{pmatrix} - \begin{pmatrix} 3 \\ 4 \end{pmatrix}\right] = \begin{pmatrix} 9 \\ -5 \end{pmatrix}$$

$$\begin{pmatrix} 1 \\ 9 \end{pmatrix} - 2\begin{pmatrix} p-3 \\ q-4 \end{pmatrix} = \begin{pmatrix} 9 \\ -5 \end{pmatrix}$$

$$\begin{pmatrix} 2p-6 \\ 2q-8 \end{pmatrix} = \begin{pmatrix} -8 \\ 14 \end{pmatrix}$$

$$2p-6 = -8,$$

$$2p = -2$$

$$p = -1$$

$$2q-8 = 14$$

$$q = 11$$

$$17 \text{ (a) } \vec{QR} = \begin{pmatrix} -3 \\ -5 \end{pmatrix} + \begin{pmatrix} 2 \\ 7 \end{pmatrix}$$

$$= \begin{pmatrix} -1 \\ 2 \end{pmatrix}$$

$$(b) \vec{PS} = \begin{pmatrix} -1 \\ 6 \end{pmatrix} + \begin{pmatrix} m \\ 2 \end{pmatrix}$$

$$= \begin{pmatrix} m-1 \\ 8 \end{pmatrix}$$

$$\begin{pmatrix} m-1 \\ 8 \end{pmatrix} = \lambda \begin{pmatrix} -1 \\ 2 \end{pmatrix}$$

$$m-1 = -\lambda \dots \textcircled{1}$$

$$8 = 2\lambda$$

$$\lambda = 4$$

$$m-1 = -4$$

$$m = -3$$

$$(c) \sqrt{m^2 + 2^2} = 2\sqrt{(-1)^2 + 2^2}$$

$$m^2 + 4 = 4(5)$$

$$m^2 = 16$$

$$m = \pm 4$$

Praktis Sumatif

Kertas 1

$$1 \text{ (a) (i) } \vec{OP} = 2\vec{a} - 3\vec{b}$$

$$(ii) \vec{PQ} = \vec{a} + 4\vec{b}$$

$$(b) |\vec{r}| = 1$$

$$\sqrt{(\sqrt{m})^2 + (1-n)^2} = 1$$

$$m + 1 - 2n + n^2 = 1$$

$$m = 2n - n^2$$

$$2 \text{ (a) } \vec{OR} = 2\vec{PQ}$$

$$= 2(-\vec{p} + \vec{q})$$

$$= 2\vec{q} - 2\vec{p}$$

$$\begin{aligned}
 \text{(b) } \vec{OS} &= \vec{OQ} + \vec{QS} \\
 &= \vec{OQ} + \frac{1}{2}\vec{QR} \\
 &= \underline{q} + \frac{1}{2}(-\underline{q} + 2\underline{q} - 2\underline{p}) \\
 &= \underline{q} + \frac{1}{2}(\underline{q} - 2\underline{p}) \\
 &= \frac{3}{2}\underline{q} - \underline{p}
 \end{aligned}$$

$$\begin{aligned}
 \text{3 (a) (i) } \vec{JM} &= 2(4\underline{x}) - 7\underline{y} \\
 \vec{JM} &= 8\underline{x} - 7\underline{y} \\
 \text{(ii) } |\vec{JM}| &= \sqrt{8^2 + 7^2} \\
 &= 15 \text{ unit/units}
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } \underline{p} &= \lambda(24\underline{i} - 7\underline{j}) \\
 \lambda\sqrt{24^2 + (-7)^2} &= 100 \\
 25\lambda &= 100 \\
 \lambda &= 4
 \end{aligned}$$

$$\begin{aligned}
 \underline{p} &= 4(24\underline{i} - 7\underline{j}) \\
 &= 96\underline{i} - 28\underline{j}
 \end{aligned}$$

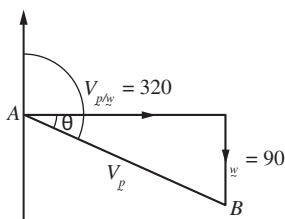
$$\begin{aligned}
 \text{4 (a) } \vec{PQ} &= 4\underline{i} + 4\underline{j} - (-2\underline{i} + \underline{j}) \\
 &= 6\underline{i} + 3\underline{j} \\
 \vec{OR} &= \vec{OP} + \vec{PR} \\
 &= -2\underline{i} + \underline{j} + \frac{2}{3}\vec{PQ} \\
 &= -2\underline{i} + \underline{j} + \frac{2}{3}(6\underline{i} + 3\underline{j}) \\
 &= -2\underline{i} + \underline{j} + 4\underline{i} + 2\underline{j} \\
 \vec{OR} &= 2\underline{i} + 3\underline{j}
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } \vec{OS} &= 9\underline{i} + 6\underline{j} \\
 \vec{OS} &= \lambda\vec{PQ} \\
 9\underline{i} + 6\underline{j} &= \lambda(6\underline{i} + 3\underline{j}) \\
 &= 6\lambda\underline{i} + 3\lambda\underline{j} \\
 \underline{i}: 9 &= 6\lambda \\
 \lambda &= \frac{3}{2} \\
 \underline{j}: 6 &= 3\lambda \\
 \lambda &= 2
 \end{aligned}$$

Nilai λ yang berbeza. \vec{OS} dan \vec{PQ} adalah tidak selari. Zarah C mungkin akan bertembung dengan zarah A dan B.

Different values of λ . \vec{OS} and \vec{PQ} are not parallel. Particle C may collide with particles A and B.

5 (a) (i)



$$\begin{aligned}
 \tan \theta &= \frac{90}{320} \\
 \theta &= 15.71^\circ \\
 \text{Bearing} &= 90^\circ + 15.71^\circ \\
 &= 105.71^\circ
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii) } |v_p| &= \sqrt{320^2 + 90^2} \\
 |v_p| &= 332.42 \text{ km h}^{-1} \\
 332.42 &= \frac{860}{t} \\
 t &= 2 \text{ jam/hours } 35 \text{ minit/minutes}
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) (i) } \underline{r} &= 3\underline{p} + m\underline{q} \\
 &= 3(-\underline{i} + 4\underline{j}) + m(5\underline{i} - 2\underline{j}) \\
 &= (-3 + 5m)\underline{i} + (12 - 2m)\underline{j} \\
 &= \lambda\underline{i} + 0\underline{j} \\
 \text{Bandingkan/Compare } \underline{j}: & 12 - 2m = 0 \\
 & m = 6
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii) } \underline{r} &= (-3 + 5(6))\underline{i} \\
 \underline{r} &= 27\underline{i} \\
 |\underline{r}| &= 27 \text{ unit/units}
 \end{aligned}$$

Kertas 2

$$\begin{aligned}
 \text{1 (a) } \vec{QR} &= -h\underline{q} + 2k\underline{s} + k\underline{q} \\
 &= 2k\underline{s} + (k - h)\underline{q} \\
 &= (h + 1)\underline{s} - \underline{q} \\
 \text{Bandingkan/Compare } \underline{s}: & 2k = h + 1 \dots \textcircled{1} \\
 \text{Bandingkan/Compare } \underline{q}: & k - h = -1 \\
 & k = h - 1 \dots \textcircled{2}
 \end{aligned}$$

$$\begin{aligned}
 \text{Gantikan } \textcircled{2} \text{ ke dalam } \textcircled{1}/\text{Substitute } \textcircled{2} \text{ into } \textcircled{1}, \\
 2(h - 1) &= h + 1 \\
 2h - 2 &= h + 1 \\
 h &= 3
 \end{aligned}$$

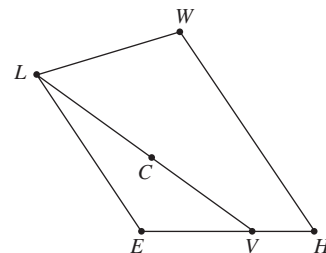
$$\begin{aligned}
 \text{Gantikan ke dalam } \textcircled{2}/\text{Substitute into } \textcircled{2}, \\
 k &= 3 - 1 \\
 k &= 2
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } \vec{OQ} &= 3\underline{q}, \vec{SR} = 2\underline{q}, \\
 \vec{OP} &= \underline{q}
 \end{aligned}$$

$$\frac{\Delta OPS}{\Delta OQR} = \frac{\frac{1}{2}|\underline{q}| \times h}{\frac{1}{2}|3\underline{q}| \times h}$$

$$\begin{aligned}
 \frac{\Delta OPS}{15} &= \frac{1}{3} \\
 \Delta OPS &= 5 \text{ unit}^2/\text{units}^2
 \end{aligned}$$

2



$$\begin{aligned}
 \text{(a) (i) } \vec{EW} &= \vec{EH} + \vec{HW} \\
 &= 3\underline{x} + 5\underline{y}
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii) } \vec{EC} &= \vec{EL} + \vec{LC} \\
 &= \vec{EL} + \frac{1}{2}\vec{LV} \\
 &= 4\mathbf{y} + \frac{1}{2}(-4\mathbf{y} + 2\mathbf{x}) \\
 &= 4\mathbf{y} - 2\mathbf{y} + \mathbf{x} \\
 &= \mathbf{x} + 2\mathbf{y}
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } \vec{EC} &= \lambda\vec{EW} \\
 \mathbf{x} + 2\mathbf{y} &= \lambda(3\mathbf{x} + 5\mathbf{y}) \\
 \mathbf{x} + 2\mathbf{y} &= 3\lambda\mathbf{x} + 5\lambda\mathbf{y} \\
 \text{Bandingkan/Compare } \mathbf{x}: & 3\lambda = 1 \\
 & \lambda = \frac{1}{3} \\
 \text{Bandingkan/Compare } \mathbf{y}: & 5\lambda = 2 \\
 & \lambda = \frac{2}{5}
 \end{aligned}$$

Nilai λ yang berbeza. E, C dan W tidak segaris. Maka, Riduan tidak akan melalui laluan kanopi.
Different values of λ . E, C and W are not collinear. Riduan will not pass through the canopy walkway.

$$\begin{aligned}
 \text{3 (a) (i) } \vec{WV} &= \vec{OV} - \frac{1}{2}\vec{OU} \\
 &= 3\mathbf{v} - \frac{1}{2}(2\mathbf{u}) \\
 &= 3\mathbf{v} - \mathbf{u} \\
 \text{(ii) } \vec{OX} &= \vec{OU} + \frac{1}{4}\vec{UV} \\
 \vec{OX} &= 2\mathbf{u} + \frac{1}{4}(3\mathbf{v} - 2\mathbf{u}) \\
 &= 2\mathbf{u} + \frac{3}{4}\mathbf{v} - \frac{1}{2}\mathbf{u} \\
 &= \frac{3}{2}\mathbf{u} + \frac{3}{4}\mathbf{v}
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } \vec{OY} &= \vec{OW} + k\vec{WV} \\
 &= \mathbf{u} + k(3\mathbf{v} - \mathbf{u}) \\
 &= (1 - k)\mathbf{u} + 3k\mathbf{v}
 \end{aligned}$$

$$\begin{aligned}
 \text{(c) } \vec{OY} &= \frac{4}{7}\vec{OX} \\
 (1 - k)\mathbf{u} + 3k\mathbf{v} &= \frac{4}{7}\left(\frac{3}{2}\mathbf{u} + \frac{3}{4}\mathbf{v}\right) \\
 (1 - k)\mathbf{u} + 3k\mathbf{v} &= \frac{6}{7}\mathbf{u} + \frac{3}{7}\mathbf{v}
 \end{aligned}$$

Bandingkan/Compare \mathbf{u} :

$$\begin{aligned}
 1 - k &= \frac{6}{7} \\
 k &= \frac{1}{7}
 \end{aligned}$$

atau/or

$$\text{Bandingkan/Compare } \mathbf{v}: 3k = \frac{3}{7}$$

$$\begin{aligned}
 \text{4 (a) (i) } \vec{EF} &= \vec{EA} + \vec{AF} \\
 &= -\mathbf{y} + \frac{1}{2}\vec{AB} \\
 &= \frac{1}{2}\mathbf{x} - \mathbf{y}
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii) } \vec{AC} &= \frac{4}{3}\vec{AD} \\
 &= \frac{4}{3}[\vec{AE} + \vec{ED}] \\
 &= \frac{4}{3}\left[\mathbf{y} + \frac{1}{2}(\mathbf{x} - \mathbf{y})\right] \\
 &= \frac{4}{3}\left[\frac{1}{2}\mathbf{x} + \frac{1}{2}\mathbf{y}\right] \\
 &= \frac{2}{3}\mathbf{x} + \frac{2}{3}\mathbf{y}
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } \vec{CB} &= \vec{CA} + \vec{AB} \\
 &= -\frac{2}{3}\mathbf{x} - \frac{2}{3}\mathbf{y} + \mathbf{x} \\
 &= \frac{1}{3}\mathbf{x} - \frac{2}{3}\mathbf{y} \\
 \vec{EF} &= \lambda\vec{CB} \\
 \frac{1}{2}\mathbf{x} - \mathbf{y} &= \lambda\left(\frac{1}{3}\mathbf{x} - \frac{2}{3}\mathbf{y}\right) \\
 \frac{1}{2}(\mathbf{x} - 2\mathbf{y}) &= \frac{1}{3}\lambda(\mathbf{x} - 2\mathbf{y}) \\
 \frac{1}{2} &= \frac{1}{3}\lambda \\
 \lambda &= \frac{3}{2}
 \end{aligned}$$

$$\begin{aligned}
 \vec{EF} &= \frac{3}{2}\vec{CB} \\
 \therefore \vec{EF} // \vec{CB} & \text{ (Tertunjuk/Shown)} \\
 \frac{EF}{CB} &= \frac{3}{2} \\
 EF : CB &= 3 : 2
 \end{aligned}$$

$$\begin{aligned}
 \text{5 (a) } \mathbf{v}_p &= \lambda(3\mathbf{i} + 4\mathbf{j}) \\
 \lambda\sqrt{3^2 + 4^2} &= 25 \\
 5\lambda &= 25 \\
 \lambda &= 5 \\
 \mathbf{v}_p &= 5(3\mathbf{i} + 4\mathbf{j}) \\
 &= 15\mathbf{i} + 20\mathbf{j}
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } \vec{OP} &= 2(15\mathbf{i} + 20\mathbf{j}) \\
 &= 30\mathbf{i} + 40\mathbf{j}
 \end{aligned}$$

$$\begin{aligned}
 \text{(c) } \vec{OQ} &= \vec{OQ} + t\mathbf{v}_Q \\
 \vec{OQ} &= (78\mathbf{i} + 13\mathbf{j}) + t(-9\mathbf{i} + 16\mathbf{j}) \\
 &= (78 - 9t)\mathbf{i} + (13 + 16t)\mathbf{j}
 \end{aligned}$$

$$\begin{aligned}
 \text{(d) } \vec{OP} &= \vec{OQ} \\
 t(15\mathbf{i} + 20\mathbf{j}) &= (78 - 9t)\mathbf{i} + (13 + 16t)\mathbf{j} \\
 15t\mathbf{i} + 20t\mathbf{j} &= (78 - 9t)\mathbf{i} + (13 + 16t)\mathbf{j} \\
 \text{Bandingkan/Compare } \mathbf{i}: & 15t = 78 - 9t \\
 & 24t = 78 \\
 & t = 3.25 \\
 \text{Bandingkan/Compare } \mathbf{j}: & 20t = 13 + 16t \\
 & 4t = 13 \\
 & t = 3.25
 \end{aligned}$$

\therefore Kapal P dan kapal Q akan bertemu.
Ship P and ship Q will meet.

$$\begin{aligned}
 \text{6 (a) (i) } \vec{RS} &= -6\mathbf{r} + 5\mathbf{t} + 8\mathbf{r} + 4\mathbf{t} \\
 &= 2\mathbf{r} + 9\mathbf{t}
 \end{aligned}$$

$$\begin{aligned} \text{(ii) } \vec{OV} &= 5\underline{t} + \frac{1}{4}(8\underline{r} + 4\underline{t}) \\ &= 5\underline{t} + 2\underline{r} + \underline{t} \\ &= 2\underline{r} + 6\underline{t} \end{aligned}$$

$$\begin{aligned} \text{(b) } \vec{UV} &= \vec{UR} + \vec{RO} + \vec{OV} \\ &= -\frac{1}{2}(2\underline{r} + 9\underline{t}) - 6\underline{r} + 2\underline{r} + 6\underline{t} \\ &= -\underline{r} - \frac{9}{2}\underline{t} - 4\underline{r} + 6\underline{t} \\ &= \frac{3}{2}\underline{t} - 5\underline{r} \end{aligned}$$

$$\begin{aligned} \vec{WS} &= \vec{WT} + \vec{TS} \\ &= -k\underline{r} - \underline{t} + 8\underline{r} + 4\underline{t} \\ &= (8 - k)\underline{r} + 3\underline{t} \end{aligned}$$

$$\vec{WS} = \lambda \vec{UV}$$

$$(8 - k)\underline{r} + 3\underline{t} = \lambda \left(\frac{3}{2}\underline{t} - 5\underline{r} \right)$$

$$(8 - k)\underline{r} + 3\underline{t} = -5\lambda\underline{r} + \frac{3}{2}\lambda\underline{t}$$

Bandungkan/Compare \underline{r} : $8 - k = -5\lambda \dots \textcircled{1}$

Bandungkan/Compare \underline{t} : $\frac{3}{2}\lambda = 3$

$$\lambda = 2$$

Gantikan ke dalam $\textcircled{1}$ /Substitute into $\textcircled{1}$,

$$\begin{aligned} 8 - k &= -5(2) \\ k &= 18 \end{aligned}$$

$$\text{(c) } |\vec{OR}| = 6(2) = 12$$

$$|\vec{OT}| = 5(1) = 5$$

$$\begin{aligned} |\vec{RT}| &= \sqrt{12^2 + 5^2} \\ &= 13 \text{ unit/units} \end{aligned}$$

$$\begin{aligned} \text{7 (a) (i) } \vec{PQ} &= \vec{PO} + \vec{OQ} \\ &= -6\underline{p} + 15\underline{q} \end{aligned}$$

$$\begin{aligned} \text{(ii) } \vec{OR} &= \vec{OP} + \vec{PR} \\ &= 6\underline{p} + \frac{3}{5}(15\underline{q}) \\ &= 6\underline{p} + 9\underline{q} \end{aligned}$$

$$\begin{aligned} \text{(b) } \vec{OS} &= \vec{OP} + \vec{PS} \\ &= 6\underline{p} + n\vec{PQ} \\ &= 6\underline{p} + n(-6\underline{p} + 15\underline{q}) \\ &= 6\underline{p} - 6n\underline{p} + 15n\underline{q} \\ &= (6 - 6n)\underline{p} + 15n\underline{q} \end{aligned}$$

$$\begin{aligned} \text{(c) (i) } \vec{OS} &= \lambda \vec{OR} \\ (6 - 6n)\underline{p} + 15n\underline{q} &= \lambda(6\underline{p} + 9\underline{q}) \\ &= 6\lambda\underline{p} + 9\lambda\underline{q} \end{aligned}$$

Bandungkan/Compare \underline{p} : $6\lambda = 6 - 6n$

$$\lambda = 1 - n \dots \textcircled{1}$$

Bandungkan/Compare \underline{q} : $9\lambda = 15n$

$$\lambda = \frac{5}{3}n \dots \textcircled{2}$$

Gantikan $\textcircled{1}$ ke dalam $\textcircled{2}$ /Substitute $\textcircled{1}$ into $\textcircled{2}$,

$$\frac{5}{3}n = 1 - n$$

$$\frac{8}{3}n = 1$$

$$n = \frac{3}{8}$$

(ii) Gantikan ke dalam $\textcircled{2}$ /Substitute into $\textcircled{2}$,

$$\lambda = \frac{5}{3} \left(\frac{3}{8} \right)$$

$$= \frac{5}{8}$$

$$\vec{OS} = \frac{5}{8} \vec{OR}$$

$$\frac{OS}{OR} = \frac{5}{8}$$

$$OS : OR = 5 : 8$$

$$\therefore OS : SR = 5 : 3$$

$$\begin{aligned} \text{8 (a) (i) } \vec{OP} &= 10\underline{a} + \frac{1}{3}(6\underline{b}) \\ &= 10\underline{a} + 2\underline{b} \end{aligned}$$

$$\begin{aligned} \text{(ii) } \vec{AQ} &= 6\underline{b} - \frac{3}{5}(10\underline{a}) \\ &= 6\underline{b} - 6\underline{a} \end{aligned}$$

$$\begin{aligned} \text{(b) } \vec{AR} &= h(6\underline{b} - 6\underline{a}) \\ &= -6h\underline{a} + 6h\underline{b} \end{aligned}$$

$$\vec{AR} = \vec{AO} + k\vec{OP}$$

$$= -10\underline{a} + k(10\underline{a} + 2\underline{b})$$

$$= (10k - 10)\underline{a} + 2k\underline{b}$$

$$-6h\underline{a} + 6h\underline{b} = (10k - 10)\underline{a} + 2k\underline{b}$$

Bandungkan/Compare \underline{a} : $-6h = 10k - 10 \dots \textcircled{1}$

Bandungkan/Compare \underline{b} : $6h = 2k \dots \textcircled{2}$

Gantikan $\textcircled{2}$ ke dalam $\textcircled{1}$ /Substitute $\textcircled{2}$ into $\textcircled{1}$,

$$-2k = 10k - 10$$

$$k = \frac{5}{6}$$

Gantikan ke dalam $\textcircled{2}$ /Substitute into $\textcircled{2}$

$$6h = 2 \left(\frac{5}{6} \right)$$

$$h = \frac{5}{18}$$

$$\begin{aligned} \text{(c) } \vec{OP} &= 10(\underline{i} - 2\underline{j}) + 2(3\underline{i} - 5\underline{j}) \\ &= 10\underline{i} - 20\underline{j} + 6\underline{i} - 10\underline{j} \\ &= 16\underline{i} - 30\underline{j} \end{aligned}$$

$$\begin{aligned} |\vec{OP}| &= \sqrt{16^2 + (-30)^2} \\ &= 34 \text{ unit/units} \end{aligned}$$