

Penyelesaian Lengkap

PRAKTIS 7

Kertas 1

Bahagian A

1 Katakan/Let $Q(h, k)$

$$h = \frac{nx_1 + mx_2}{m + n}$$

$$h = \frac{(1)(-3) + (2)(6)}{(2) + (1)}$$

$$3h = 9$$

$$h = 3$$

$$k = \frac{ny_1 + my_2}{m + n}$$

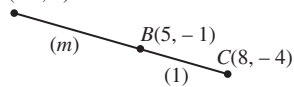
$$k = \frac{(1)(6) + (2)(-9)}{(2) + (1)}$$

$$3k = -12$$

$$k = -4$$

$$\therefore Q(3, -4)$$

2 (a) $A(-4, 8)$



$$5 = \frac{(1)(-4) + (m)(8)}{(m) + (1)}$$

$$5m + 5 = -4 + 8m$$

$$-3m = -9$$

$$m = 3$$

Kaedah alternatif Alternative method

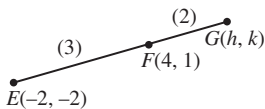
$$-1 = \frac{(1)(8) + (m)(-4)}{(m) + (1)}$$

$$-m - 1 = 8 - 4m$$

$$3m = 9$$

$$m = 3$$

(b)



Katakan/Let $G(h, k)$

$$4 = \frac{(2)(-2) + (3)(h)}{(3) + (2)}$$

$$20 = -4 + 3h$$

$$24 = 3h$$

$$h = 8$$

$$1 = \frac{(2)(-2) + (3)(k)}{(3) + (2)}$$

$$5 = -4 + 3k$$

$$9 = 3k$$

$$k = 3$$

$$\therefore G(8, 3)$$

$$3 \quad m_{FG} = \frac{3-1}{-2-2} = -\frac{1}{2}$$

$$m_{FG} \times m_2 = -1, \therefore m_2 = 2$$

Persamaan garis lurus yang berserenjang dengan garis lurus FG :

Equation of the straight line that is perpendicular to straight line FG :

$$y - (-9) = (2)(x - 4)$$

$$y + 9 = 2x - 8$$

$$y = 2x - 17$$

$$4 \quad (a) \quad m_{PQ} = \frac{3}{2}$$

$$m_{PQ} \times m_{QR} = -1$$

$$\therefore m_{QR} = -\frac{2}{3}$$

Persamaan bagi QR :

Equation of QR :

$$y = -\frac{2}{3}x + c$$

Pada/At $(13, 2)$,

$$2 = -\frac{2}{3}(13) + c$$

$$c = \frac{32}{3}$$

$$y = -\frac{2}{3}x + \frac{32}{3}$$

$$(b) \quad y = \frac{3}{2}x + 2 \dots \textcircled{1}$$

$$y = -\frac{2}{3}x + \frac{32}{3} \dots \textcircled{2}$$

$$\textcircled{1} = \textcircled{2}:$$

$$\frac{3}{2}x + 2 = -\frac{2}{3}x + \frac{32}{3}$$

$$9x + 12 = -4x + 64$$

$$13x = 52$$

$$x = 4$$

Daripada/From $\textcircled{1}$,

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

$$= 8$$

$$\therefore Q(4, 8)$$

5 (a) Luas/Area of ΔPQR

$$= \frac{1}{2} \begin{vmatrix} 4 & -3 & 5 & 4 \\ 6 & 2 & 0 & 6 \end{vmatrix}$$

$$= \frac{1}{2} [(4)(2) + (-3)(0) + (5)(6)] - [(6)(-3) + (2)(5) + (0)(4)]$$

$$= \frac{1}{2} |(8 + 0 + 30) - (-18 + 10 + 0)|$$

$$= \frac{1}{2} \times 46$$

$$= 23 \text{ unit}^2/\text{units}^2$$

(b) $QR = \sqrt{[5 - (-3)]^2 + (0 - 2)^2} = \sqrt{68} \text{ unit}/\text{units}$

(c) Katakan h = jarak terpendek dari bucu P ke garis QR

Let h = shortest distance from vertex P to line QR

$$\frac{1}{2} \times \sqrt{68} \times h = 23$$

$$h = \frac{46}{\sqrt{68}} = 5.578 \text{ unit}/\text{units}$$

6 (a) $m_{HG} = \frac{2-7}{8-6} = -\frac{5}{2}$

Katakan pintasan- y bagi EF ialah b .

Let the y -intercept of EF is b .

$$-\frac{b}{2} = -\frac{5}{2}$$

$$b = 5$$

$$\therefore E(0, 5)$$

(b) Luas $EFGH = 2 \times \text{Luas } \triangle EFG$

Area of $EFGH = 2 \times \text{Area of } \triangle EFG$

$$= 2 \times \frac{1}{2} \begin{vmatrix} 0 & 2 & 8 & 0 \\ 5 & 0 & 2 & 5 \end{vmatrix}$$

$$= |[(0)(0) + (2)(2) + (8)(5)] - [(5)(2) + (0)(8) + (2)(0)]|$$

$$= |(0 + 4 + 40) - (10 + 0 + 0)|$$

$$= |44 - 10|$$

$$= 34 \text{ unit}^2/\text{units}^2$$

7 (a) $(x - x_1)^2 + (y - y_1)^2 = (x - x_2)^2 + (y - y_2)^2$

$$[x - (-3)]^2 + (y - 4)^2 = (x - 5)^2 + [y - (-6)]^2$$

$$(x + 3)^2 + (y - 4)^2 = (x - 5)^2 + (y + 6)^2$$

$$x^2 + 6x + 9 + y^2 - 8y + 16 = x^2 - 10x + 25 + y^2 + 12y + 36$$

$$16x - 20y - 36 = 0$$

$$4x - 5y - 9 = 0$$

(b) $(x - x_1)^2 + (y - y_1)^2 = r^2$

$$(x - 2)^2 + [y - (-3)]^2 = 6^2$$

$$(x - 2)^2 + (y + 3)^2 = 6^2$$

$$x^2 - 4x + 4 + y^2 + 6y + 9 = 36$$

$$x^2 + y^2 - 4x + 6y - 23 = 0$$

8 (a) Apabila/When $y = 5$,

$$x^2 + (5)^2 - 3x + 3(5) - 26 = 0$$

$$x^2 - 3x + 14 = 0$$

$$a = 1, b = -3, c = 14$$

$$b^2 - 4ac = (-3)^2 - 4(1)(14)$$

$$= -47 < 0$$

\therefore Lokus Z tidak bersilang dengan garis lurus $y = 5$.

Locus Z does not intersect straight line $y = 5$.

(b) $x^2 + y^2 - 3x + 3y - 26 = 0 \dots \textcircled{1}$

$$y = x + 3 \dots \textcircled{2}$$

Gantikan $\textcircled{2}$ ke dalam $\textcircled{1}$,

Substitute $\textcircled{2}$ into $\textcircled{1}$,

$$x^2 + (x + 3)^2 - 3x + 3(x + 3) - 26 = 0$$

$$x^2 + (x^2 + 6x + 9) - 3x + (3x + 9) - 26 = 0$$

$$2x^2 + 6x - 8 = 0$$

$$x^2 + 3x - 4 = 0$$

$$(x + 4)(x - 1) = 0$$

$$x = -4, x = 1$$

Apabila/When $x = -4$, $y = (-4) + 3 = -1$

Apabila/When $x = 1$, $y = (1) + 3 = 4$

Maka, titik-titik persilangan ialah $(-4, -1)$ dan $(1, 4)$.

Thus, the points of intersection are $(-4, -1)$ and $(1, 4)$.

Bahagian B

9 (a) Titik tengah OF = Titik tengah DE
Midpoint of OF = Midpoint of DE

$$= \left(\frac{3+7}{2}, \frac{6+2}{2} \right)$$

$$= (5, 4)$$

$$F = (5 \times 2, 4 \times 2)$$

$$= (10, 8)$$

(b) Luas segi empat selari $DOEF = 2 \times \text{Luas } \triangle ODF$

Area of parallelogram $DOEF$

$= 2 \times \text{Area of } \triangle ODF$

$$= 2 \times \frac{1}{2} \begin{vmatrix} 0 & 3 & 10 & 0 \\ 0 & 6 & 8 & 0 \end{vmatrix}$$

$$= |(0)(6) + (3)(8) + (10)(0)|$$

$$- [(0)(3) + (6)(10) + (8)(0)]|$$

$$= |(0 + 24 + 0) - (0 + 60 + 0)|$$

$$= |-36|$$

$$= 36 \text{ unit}^2/\text{units}^2$$

(c) $OE = \sqrt{7^2 + 2^2} = \sqrt{53}$

Katakan h = jarak terpendek dari D ke garis OE

Let h = shortest distance from D to line OE

$$h \times \sqrt{53} = 36$$

$$h = \frac{36}{\sqrt{53}} = 4.945 \text{ unit}/\text{units}$$

10 (a) $G = \left(\frac{nx_1 + mx_2}{m+n}, \frac{ny_1 + my_2}{m+n} \right)$

$$= \left(\frac{2(-2) + 1(7)}{1+2}, \frac{2(0) + 1(12)}{1+2} \right)$$

$$= (1, 4)$$

(b) Luas/Area of $\triangle PQG$

$$= \frac{1}{2} \begin{vmatrix} -2 & 9 & 1 & -2 \\ 0 & -2 & 4 & 0 \end{vmatrix}$$

$$= \frac{1}{2} [(-2)(-2) + (9)(4) + (1)(0)] - [(0)(9) + (-2)(1) + (4)(-2)]$$

$$= \frac{1}{2} [(4 + 36 + 0) - [0 + (-2) + (-8)]]$$

$$= \frac{1}{2} |40 - (-10)|$$

$$= \frac{1}{2} \times 50$$

$$= 25 \text{ unit}^2/\text{units}^2$$

Luas bagi $\triangle PQR$ /Area of $\triangle PQR$

$$= 3 \times 25 \text{ unit}^2/\text{units}^2$$

$$= 75 \text{ unit}^2/\text{units}^2$$

1 (a) $x - 2y + 16 = 0$

$$y = \frac{1}{2}x + 8$$

$$m_{GH} = \frac{1}{2}$$

$$m_{GH} \times m_{HJ} = -1, \therefore m_{HJ} = -2$$

Persamaan bagi HJ :

Equation of HJ :

$$y - 4 = -2(x - 7)$$

$$y - 4 = -2x + 14$$

$$y = -2x + 18$$

(b) $y = \frac{1}{2}x + 8 \dots \textcircled{1}$

$$y = -2x + 18 \dots \textcircled{2}$$

$$\textcircled{1} = \textcircled{2}:$$

$$\frac{1}{2}x + 8 = -2x + 18$$

$$x + 16 = -4x + 36$$

$$5x = 20$$

$$x = 4$$

$$y = -2(4) + 18$$

$$= 10$$

$$\therefore H(4, 10)$$

2 (a) $x + 2y + 4 = 0$

$$y = -\frac{1}{2}x - 2$$

$$m_{NP} = m_{RQ} = -\frac{1}{2}$$

Persamaan bagi NP :

Equation of NP :

$$y - 3 = -\frac{1}{2}(x - 4)$$

$$y - 3 = -\frac{1}{2}x + 2$$

$$y = -\frac{1}{2}x + 5$$

Pada/At $(h, 0)$,

$$0 = -\frac{1}{2}(h) + 5$$

$$h = 10$$

(b) $m_{NP} \times m_{NR} = -1, \therefore m_{NR} = 2$

Persamaan bagi NR :

Equation of NR :

$$y - 3 = 2(x - 4)$$

$$y - 3 = 2x - 8$$

$$y = 2x - 5$$

(c) $y = -\frac{1}{2}x - 2 \dots \textcircled{1}$

$$y = 2x - 5 \dots \textcircled{2}$$

$$\textcircled{1} = \textcircled{2}:$$

$$2x - 5 = -\frac{1}{2}x - 2$$

$$4x - 10 = -x - 4$$

$$5x = 6$$

$$x = 1.2$$

$$y = 2(1.2) - 5$$

$$= -2.6$$

$$\therefore R(1.2, -2.6)$$

3 (a) $G = \left(\frac{4+8}{2}, \frac{3+7}{2}\right)$

$$= (6, 5)$$

(b) $FG : GK = 1 : 4$

$F(5, 6), G(6, 5), K(a, b)$

$$\frac{4(5) + 1(a)}{1 + 4} = 6$$

$$20 + a = 30$$

$$a = 10$$

$$\frac{4(6) + 1(b)}{1 + 4} = 5$$

$$24 + b = 25$$

$$b = 1$$

$$\therefore K(10, 1)$$

(c) $m_{FE} = \frac{6-3}{5-4} = 3$

Persamaan bagi FE :

Equation of FE :

$$y - 6 = 3(x - 5)$$

$$y - 6 = 3x - 15$$

$$y = 3x - 9 \dots \textcircled{1}$$

$$m_{HK} = \frac{7-1}{8-10} = -3$$

Persamaan bagi HK :

Equation of HK :

$$y - 7 = -3(x - 8)$$

$$y - 7 = -3x + 24$$

$$y = -3x + 31 \dots \textcircled{2}$$

$$\textcircled{1} = \textcircled{2}:$$

$$3x - 9 = -3x + 31$$

$$6x = 40$$

$$x = \frac{20}{3}$$

Daripada/From $\textcircled{1}$,

$$y = 3\left(\frac{20}{3}\right) - 9 = 11$$

Maka, titik persilangan ialah $\left(\frac{20}{3}, 11\right)$.

Thus, the point of intersection is $\left(\frac{20}{3}, 11\right)$.

Bahagian B

4 (a) (i) $2y - x + 3 = 0$

$$y = \frac{1}{2}x - \frac{3}{2}$$

$$m_{FH} = \frac{1}{2}$$

$$m_{FH} \times m_{EF} = -1, \therefore m_{EF} = -2$$

Persamaan bagi EF :

Equation of EF :

$$y - 10 = -2(x - 3)$$

$$y - 10 = -2x + 6$$

$$y = -2x + 16$$

$$2x + y = 16$$

(ii) $2x + y = 16 \dots \textcircled{1}$

$$2y - x + 3 = 0 \dots \textcircled{2}$$

Daripada/From $\textcircled{1}$, $y = 16 - 2x \dots \textcircled{3}$

Gantikan $\textcircled{3}$ ke dalam $\textcircled{2}$,

Substitute $\textcircled{3}$ into $\textcircled{2}$,

$$2(16 - 2x) - x + 3 = 0$$

$$32 - 4x - x + 3 = 0$$

$$-5x = -35$$

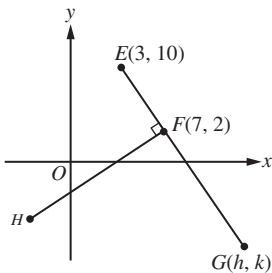
$$x = 7$$

$$y = 16 - 2(7)$$

$$= 2$$

$$\therefore F(7, 2)$$

(b)



$$EF : FG = 1 : 3$$

Katakan/Let $G(h, k)$

$$7 = \frac{(3)(3) + (1)(h)}{1 + 3}$$

$$28 = 9 + h$$

$$h = 19$$

$$2 = \frac{(3)(10) + (1)(k)}{1 + 3}$$

$$8 = 30 + k$$

$$k = -22$$

$$\therefore G(19, -22)$$

(b) $(x - 7)^2 + (y - 2)^2 = 7^2$

$$x^2 - 14x + 49 + y^2 - 4y + 4 = 49$$

$$x^2 + y^2 - 14x - 4y + 4 = 0$$

5 (a) $m = \frac{9 - 6}{6 - (-3)} = \frac{1}{3}$

$$y - 6 = \frac{1}{3}[x - (-3)]$$

$$3y - 18 = x + 3$$

$$3y = x + 21$$

(b) Luas /Area of $\triangle OPR$

$$= \frac{1}{2} \begin{vmatrix} 0 & -3 & 6 & 0 \\ 0 & 6 & 9 & 0 \end{vmatrix}$$

$$= \frac{1}{2} [(0)(6) + (-3)(9) + (6)(0)]$$

$$- [(0)(-3) + (6)(6) + (9)(0)]$$

$$= \frac{1}{2} [(0 - 27 + 0) - (0 + 36 + 0)]$$

$$= \frac{1}{2} |-63|$$

$$= 31.5 \text{ unit}^2/\text{units}^2$$

(c) $Q = \left(\frac{(1)(-3) + (2)(6)}{2 + 1}, \frac{(1)(6) + (2)(9)}{2 + 1} \right)$

$$= \left(\frac{9}{3}, \frac{24}{3} \right)$$

$$= (3, 8)$$

(d) $(x - 3)^2 + (y - 8)^2 = 5^2$

$$x^2 - 6x + 9 + y^2 - 16y + 64 = 25$$

$$x^2 + y^2 - 6x - 16y + 48 = 0$$

6 (a) $x - 3y + 1 = 0$

$$y = \frac{1}{3}x + \frac{1}{3}$$

$$m_{AD} = \frac{1}{3}$$

Persamaan bagi BC:

Equation of BC:

$$y = \frac{1}{3}x - 3$$

(b) $m_{DC} \times m_{AD} = -1$

$$\therefore m_{DC} = -3$$

Persamaan bagi DC:

Equation of DC:

$$y - 2 = -3(x - 5)$$

$$y - 2 = -3x + 15$$

$$y = -3x + 17$$

(c) $y = \frac{1}{3}x - 3 \dots \textcircled{1}$

$$y = -3x + 17 \dots \textcircled{2}$$

$$\textcircled{1} = \textcircled{2}:$$

$$\frac{1}{3}x - 3 = -3x + 17$$

$$x - 9 = -9x + 51$$

$$10x = 60$$

$$x = 6$$

$$y = -3(6) + 17$$

$$= -1$$

$$\therefore C(6, -1)$$

(d) Luas/Area of $\triangle ABCD$

$$= 2 \times \triangle BCD$$

$$= 2 \times \frac{1}{2} \begin{vmatrix} 0 & 6 & 5 & 0 \\ -3 & -1 & 2 & -3 \end{vmatrix}$$

$$= |[(0)(-1) + (6)(2) + (5)(-3)]$$

$$- [(-3)(6) + (-1)(5) + (2)(0)]]$$

$$= |(0 + 12 - 15) - (-18 - 5 + 0)|$$

$$= |(-3) - (-23)|$$

$$= 20 \text{ unit}^2/\text{units}^2$$

Kaedah alternatif

Alternative method

$$BC = \sqrt{[6 - (0)]^2 + [-1 - (-3)]^2} = \sqrt{40}$$

$$CD = \sqrt{[6 - (5)]^2 + [-1 - (2)]^2} = \sqrt{10}$$

$$\text{Luas/Area of } \triangle ABCD = BC \times CD$$

$$= \sqrt{40} \times \sqrt{10}$$

$$= \sqrt{400}$$

$$= 20 \text{ unit}^2/\text{units}^2$$