

# Penyelesaian Lengkap

## PRAKTIS 3

### Kertas 1

#### Bahagian A

$$\begin{aligned}
 1 \quad & 3x - y + 2z = 8 \dots \textcircled{1} \\
 & y + 4z = 1 \dots \textcircled{2} \\
 & 4x - 2z = 7 \dots \textcircled{3} \\
 & \textcircled{1} + \textcircled{2}: 3x + 6z = 9 \dots \textcircled{4} \\
 & \textcircled{3} \times 3: 12x - 6z = 21 \dots \textcircled{5} \\
 & \textcircled{4} + \textcircled{5}: 15x = 30 \\
 & \quad x = 2
 \end{aligned}$$

Daripada/From  $\textcircled{1}$ ,

$$\begin{aligned}
 3(2) - y + 2z &= 8 \\
 -y + 2z &= 2 \dots \textcircled{6} \\
 \textcircled{6} \times 2: -2y + 4z &= 4 \dots \textcircled{7} \\
 \textcircled{2} - \textcircled{7}: 3y &= -3 \\
 \quad y &= -1
 \end{aligned}$$

Daripada/From  $\textcircled{2}$ ,  $(-1) + 4z = 1$

$$\begin{aligned}
 4z &= 2 \\
 z &= \frac{1}{2}
 \end{aligned}$$

$$\therefore x = 2, y = -1, z = \frac{1}{2}$$

$$\begin{aligned}
 2 \quad & 2x + y - 2z = 11 \dots \textcircled{1} \\
 & 5x - 2y + 3z = -2 \dots \textcircled{2} \\
 & 4x - 2y + \frac{1}{2}z = 1 \dots \textcircled{3} \\
 & \textcircled{1} \times 4: 8x + 4y - 8z = 44 \dots \textcircled{4} \\
 & \textcircled{3} \times 2: 8x - 4y + z = 2 \dots \textcircled{5} \\
 & \textcircled{4} + \textcircled{5}: 16x - 7z = 46 \dots \textcircled{7} \\
 & \textcircled{1} \times 2: 4x + 2y - 4z = 22 \dots \textcircled{8} \\
 & \textcircled{8} + \textcircled{2}: 9x - z = 20 \dots \textcircled{9} \\
 & \textcircled{9} \times 7: 63x - 7z = 140 \dots \textcircled{10} \\
 & \textcircled{10} - \textcircled{7}: 47x = 94 \\
 & \quad x = 2
 \end{aligned}$$

Daripada/From  $\textcircled{7}$ ,

$$\begin{aligned}
 16(2) - 7z &= 46 \\
 -7z &= 14 \\
 z &= -2
 \end{aligned}$$

Daripada/From  $\textcircled{1}$ ,

$$\begin{aligned}
 2(2) + y - 2(-2) &= 11 \\
 \quad y &= 3 \\
 \therefore x &= 2, y = 3, z = -2
 \end{aligned}$$

$$\begin{aligned}
 3 \quad & y = -x + 3 \dots \textcircled{1} \\
 & xy - 2y(1 - y) = 6 \\
 & xy - 2y + 2y^2 = 6 \dots \textcircled{2} \\
 & \text{Daripada/From } \textcircled{1}, x = 3 - y \dots \textcircled{3} \\
 & \text{Gantikan } \textcircled{3} \text{ ke dalam } \textcircled{2}, \\
 & \text{Substitute } \textcircled{3} \text{ into } \textcircled{2},
 \end{aligned}$$

$$\begin{aligned}
 (3 - y)y - 2y + 2y^2 &= 6 \\
 3y - y^2 - 2y + 2y^2 &= 6 \\
 \quad y^2 + y - 6 &= 0 \\
 (y + 3)(y - 2) &= 0 \\
 y + 3 = 0, y - 2 &= 0 \\
 \quad y &= -3, \quad y = 2
 \end{aligned}$$

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

$$= 6$$

Apabila/When  $y = 2$ ,  $x = 3 - 2$

$$= 1$$

$$\therefore x = 6, y = -3 \text{ dan/and } x = 1, y = 2$$

$$\begin{aligned}
 4 \quad & x + 2y = 1 \dots \textcircled{1} \\
 & x^2 + 3y - y^2 = 3 \dots \textcircled{2} \\
 & \text{Daripada/From } \textcircled{1}, x = 1 - 2y \dots \textcircled{3} \\
 & \text{Gantikan } \textcircled{3} \text{ ke dalam } \textcircled{2}, \\
 & \text{Substitute } \textcircled{3} \text{ into } \textcircled{2},
 \end{aligned}$$

$$\begin{aligned}
 (1 - 2y)^2 + 3y - y^2 &= 3 \\
 (1 - 4y + 4y^2) + 3y - y^2 &= 3 \\
 3y^2 - y - 2 &= 0 \\
 (y - 1)(3y + 2) &= 0 \\
 y - 1 = 0, 3y + 2 &= 0 \\
 \quad y = 1, \quad y &= -\frac{2}{3}
 \end{aligned}$$

Apabila/When  $y = 1$ ,

$$x = 1 - 2(1) = -1$$

Apabila/When  $y = -\frac{2}{3}$ ,

$$x = 1 - 2\left(-\frac{2}{3}\right) = \frac{7}{3}$$

$$\therefore x = -1, y = 1 \text{ dan/and } x = \frac{7}{3}, y = -\frac{2}{3}$$

$$\begin{aligned}
 5 \quad & 2x + y = x^2 + xy - y^2 = 15 \\
 & 2x + y = 15 \dots \textcircled{1} \\
 & x^2 + xy - y^2 = 15 \dots \textcircled{2} \\
 & \text{Daripada/From } \textcircled{1}, y = 15 - 2x \dots \textcircled{3}
 \end{aligned}$$

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

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

$$\begin{aligned}
 x^2 + x(15 - 2x) - (15 - 2x)^2 &= 15 \\
 x^2 + 15x - 2x^2 - (225 - 60x + 4x^2) &= 15 \\
 x^2 + 15x - 2x^2 - 225 + 60x - 4x^2 &= 15 \\
 -5x^2 + 75x - 240 &= 0 \\
 \quad x^2 - 15x + 48 &= 0
 \end{aligned}$$

$$\begin{aligned}
 x &= \frac{-(-15) \pm \sqrt{(-15)^2 - 4(1)(48)}}{2(1)} \\
 &= \frac{15 \pm \sqrt{33}}{2}
 \end{aligned}$$

$$x = 4.628 \text{ atau/or } x = 10.372$$

Apabila/When  $x = 4.628$ ,

$$y = 15 - 2(4.628) = 5.744$$

Apabila/When  $x = 3$ ,  
 $y = 15 - 2(10.372) = -5.744$   
 $\therefore x = 4.628, y = 5.744$  dan/and  $x = 10.372, y = -5.744$

### Bahagian B

- 6 (a) Harga 1 paket nasi lemak = RM $x$   
*Price of 1 packet of nasi lemak = RM $x$*   
 Harga 1 paket mi goreng = RM $y$   
*Price of 1 packet of fried noodles = RM $y$*   
 Harga 1 paket nasi goreng = RM $z$   
*Price of 1 packet of fried rice = RM $z$*   
 $3x + y + 2z = 15.50 \dots \textcircled{1}$   
 $x + 4y + 5z = 29.50 \dots \textcircled{2}$   
 $6x + 2y + z = 20.50 \dots \textcircled{3}$
- (b)  $\textcircled{1} \times 2: 6x + 2y + 4z = 31 \dots \textcircled{4}$   
 $\textcircled{4} - \textcircled{3}: 3z = 10.5$   
 $z = 3.5$
- Daripada/From  $\textcircled{1}$ ,  
 $3x + y + 2(3.5) = 15.50$   
 $3x + y = 8.5 \dots \textcircled{5}$
- Daripada/From  $\textcircled{2}$ ,  
 $x + 4y + 5(3.5) = 29.50$   
 $x + 4y = 12 \dots \textcircled{6}$   
 $\textcircled{5} \times 4: 12x + 4y = 34 \dots \textcircled{7}$   
 $\textcircled{7} - \textcircled{6}: 11x = 22$   
 $x = 2$
- Daripada/From  $\textcircled{1}$ ,  
 $3(2) + y + 2(3.5) = 15.50$   
 $y = 2.5$
- Maka,  
 harga 1 paket nasi lemak = RM2.00  
 harga 1 paket mi goreng = RM2.50  
 harga 1 paket nasi goreng = RM3.50  
*Thus,*  
*the price of 1 packet of nasi lemak = RM2.00*  
*the price of 1 packet of fried noodles = RM2.50*  
*the price of 1 packet of fried rice = RM3.50*

- 7 (a) Biar nilai sudut  $A = a$ , nilai sudut  $B = b$  dan nilai sudut  $C = c$   
*Let angle  $A = a$ , angle  $B = b$  and angle  $C = c$*   
 $a + b + c = 180^\circ \dots \textcircled{1}$   
 $a - c = 20^\circ \dots \textcircled{2}$   
 $b + 4c = 210^\circ \dots \textcircled{3}$
- (b) Daripada/From  $\textcircled{2}$ ,  
 $a = c + 20^\circ \dots \textcircled{4}$
- Gantikan  $\textcircled{4}$  ke dalam  $\textcircled{1}$ ,  
*Substitute  $\textcircled{4}$  into  $\textcircled{1}$ ,*  
 $(c + 20^\circ) + b + c = 180^\circ$   
 $b = 160^\circ - 2c \dots \textcircled{5}$
- Gantikan  $\textcircled{5}$  ke dalam  $\textcircled{3}$ ,  
*Substitute  $\textcircled{5}$  into  $\textcircled{3}$ ,*  
 $(160^\circ - 2c) + 4c = 210^\circ$   
 $2c = 50^\circ$   
 $c = 25^\circ$

Daripada/From  $\textcircled{2}$ ,  
 $a - 25^\circ = 20^\circ$   
 $a = 45^\circ$

Daripada/From  $\textcircled{1}$ ,  
 $45^\circ + b + 25^\circ = 180^\circ$   
 $b = 110^\circ$

Maka/Thus,  $a = 45^\circ, b = 110^\circ, c = 25^\circ$

- 8 (a) Bilangan tempat duduk di bahagian VIP =  $x$   
*Number of seats in VIP section =  $x$*   
 Bilangan tempat duduk di bahagian premium =  $y$   
*Number of seats in premium section =  $y$*   
 Bilangan tempat duduk di bahagian ekonomi =  $z$   
*Number of seats in economy section =  $z$*   
 $x + y + z = 1\ 200 \dots \textcircled{1}$   
 $90x + 60y + 30z = 73\ 500 \dots \textcircled{2}$   
 $z = 2y \dots \textcircled{3}$

- (b) Gantikan  $\textcircled{3}$  ke dalam  $\textcircled{1}$ ,

*Substitute  $\textcircled{3}$  into  $\textcircled{1}$ ,*  
 $x + y + (2y) = 1\ 200$   
 $x + 3y = 1\ 200 \dots \textcircled{4}$

Gantikan  $\textcircled{3}$  ke dalam  $\textcircled{2}$ ,  
*Substitute  $\textcircled{3}$  into  $\textcircled{2}$ ,*  
 $90x + 60y + 30(2y) = 73\ 500$   
 $90x + 12y = 7\ 350 \dots \textcircled{5}$

$\textcircled{4} \times 9: 9x + 27y = 10\ 800 \dots \textcircled{6}$   
 $\textcircled{6} - \textcircled{5}: 15y = 3\ 450$   
 $y = 230$

Daripada/From  $\textcircled{3}$ ,  
 $z = 2(230) = 460$

Daripada/From  $\textcircled{1}$ ,  
 $x + 230 + 460 = 1\ 200$   
 $x = 510$

Maka,  
 bilangan tempat duduk di bahagian VIP = 510  
 bilangan tempat duduk di bahagian premium = 230  
 bilangan tempat duduk di bahagian ekonomi = 460  
*Thus,*  
*number of seats in VIP section = 510*  
*number of seats in premium section = 230*  
*number of seats in economy section = 460*

### Kertas 2

#### Bahagian A

- 1  $x - 6 = 2y \dots \textcircled{1}$   
 $xy - x = 7y \dots \textcircled{2}$
- Daripada/From  $\textcircled{1}, x = 6 + 2y \dots \textcircled{3}$
- Gantikan  $\textcircled{3}$  ke dalam  $\textcircled{2}$ ,  
*Substitute  $\textcircled{3}$  into  $\textcircled{2}$ ,*  
 $(6 + 2y)y - (6 + 2y) = 7y$   
 $6y + 2y^2 - 6 - 2y = 7y$   
 $2y^2 - 3y - 6 = 0$   
 $a = 2, b = -3, c = -6$   
 $y = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$= \frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-6)}}{2(2)}$$

$$= \frac{3 \pm \sqrt{57}}{4}$$

$$= -1.137, 2.637$$

Apabila/When  $y = -1.137$ ,  
 $x = 6 + 2(-1.137) = 3.726$

Apabila/When  $y = 2.637$ ,  
 $x = 6 + 2(2.637) = 11.274$

$\therefore x = 3.726, y = -1.137$  dan/and  $x = 11.274, y = 2.637$

2  $x - y - 2 = 0 \dots \textcircled{1}$

$$3x^2 - 2y^2 - 3xy = x + 13 \dots \textcircled{2}$$

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

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

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

$$3x^2 - 2(x-2)^2 - 3x(x-2) = x + 13$$

$$3x^2 - 2(x^2 - 4x + 4) - 3x^2 + 6x = x + 13$$

$$3x^2 - 2x^2 + 8x - 8 - 3x^2 + 6x = x + 13$$

$$-2x^2 + 13x - 21 = 0$$

$$2x^2 - 13x + 21 = 0$$

$$(2x-7)(x-3) = 0$$

$$2x-7=0, \quad x-3=0$$

$$x = \frac{7}{2}, \quad x = 3$$

Apabila/When  $x = \frac{7}{2}$ ,

$$y = \frac{7}{2} - 2 = \frac{3}{2}$$

Apabila/When  $x = 3$ ,

$$y = (3) - 2 = 1$$

$$\therefore x = \frac{7}{2}, y = \frac{3}{2} \text{ dan/and } x = 3, y = 1$$

3  $2x - 3y = 4 \dots \textcircled{1}$

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

Daripada/From  $\textcircled{1}$ ,  $x = \frac{4+3y}{2} \dots \textcircled{3}$

Daripada/From  $\textcircled{2}$ ,  $y + x = 3xy \dots \textcircled{4}$

Gantikan  $\textcircled{3}$  ke dalam  $\textcircled{4}$ ,

Substitute  $\textcircled{3}$  into  $\textcircled{4}$ ,

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

$$2y + 4 + 3y = 12y + 9y^2$$

$$9y^2 + 7y - 4 = 0$$

$$a = 9, b = 7, c = -4$$

$$y = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-7 \pm \sqrt{(7)^2 - 4(9)(-4)}}{2(9)}$$

$$= \frac{-7 \pm \sqrt{193}}{18}$$

$$= -1.161, 0.383$$

Apabila/When  $y = -1.161$ ,

$$x = \frac{4 + 3(-1.161)}{2} = 0.259$$

Apabila/When  $y = 0.383$ ,

$$x = \frac{4 + 3(0.383)}{2} = 2.575$$

$\therefore x = 0.259, y = -1.161$  dan/and  $x = 2.575, y = 0.383$

4  $3x - y = 2 \dots \textcircled{1}$

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

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

Daripada/From  $\textcircled{2}$ ,

$$3(y+1) + (x-3) = (x-3)(y+1) \dots \textcircled{4}$$

Gantikan  $\textcircled{3}$  ke dalam  $\textcircled{4}$ ,

Substitute  $\textcircled{3}$  into  $\textcircled{4}$ ,

$$3[(3x-2)+1] + (x-3) = (x-3)[(3x-2)+1]$$

$$3(3x-1) + (x-3) = (x-3)(3x-1)$$

$$9x-3+x-3 = 3x^2-10x+3$$

$$3x^2-20x+9 = 0$$

$$a = 3, b = -20, c = 9$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(-20) \pm \sqrt{(-20)^2 - 4(3)(9)}}{2(3)}$$

$$= \frac{20 \pm \sqrt{292}}{6}$$

$$= 0.485, 6.181$$

Apabila/When  $x = 0.485$ ,

$$y = 3(0.485) - 2 = -0.545$$

Apabila/When  $x = 6.181$ ,

$$y = 3(6.181) - 2 = 16.543$$

$\therefore x = 0.485, y = -0.545$  dan/and  $x = 6.181, y = 16.543$

5 (a) Pada titik  $(-1, 2)$ ,

At point  $(-1, 2)$ ,

$$2 = m(-1) + c$$

$$-m + c = 2 \dots \textcircled{1}$$

Pada titik  $(5, 8)$ ,

At point  $(5, 8)$ ,

$$8 = m(5) + c$$

$$5m + c = 8 \dots \textcircled{2}$$

$$\textcircled{2} - \textcircled{1}: 6m = 6$$

$$m = 1$$

Daripada/From  $\textcircled{1}$ ,

$$-(1) + c = 2$$

$$c = 3$$

Maka persamaan garis lurus ialah  $y = x + 3$ .

Thus, the equation of the straight line is  $y = x + 3$ .

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

$$x^2 + 16 = 2xy \dots \textcircled{2}$$

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

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

$$x^2 + 16 = 2x(x+3)$$

$$x^2 + 16 = 2x^2 + 6x$$

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

$$(x+8)(x-2) = 0$$

$$x+8=0, \quad x-2=0$$

$$x = -8, \quad x = 2$$

Apabila/When  $x = -8$ ,  
 $y = (-8) + 3 = -5$

Apabila/When  $x = 2$ ,  
 $y = (2) + 3 = 5$

$\therefore E(-8, -5)$  dan/and  $F(2, 5)$

### Bahagian B

6 (a)  $y = 3x - 6 \dots \textcircled{1}$   
 $x^2 - y^2 + 2x - 4y = 5 \dots \textcircled{2}$

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

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

$$\begin{aligned} x^2 - (3x - 6)^2 + 2x - 4(3x - 6) &= 5 \\ x^2 - (9x^2 - 36x + 36) + 2x - 12x + 24 - 5 &= 0 \\ x^2 - 9x^2 + 36x - 36 + 2x - 12x + 24 - 5 &= 0 \\ -8x^2 + 26x - 17 &= 0 \\ 8x^2 - 26x + 17 &= 0 \end{aligned}$$

$a = 8, b = -26, c = 17$

$b^2 - 4ac = (-26)^2 - 4(8)(17)$   
 $= 132 > 0$

Maka, garis lurus  $y = 3x - 6$  bersilang dengan lengkung  $x^2 - y^2 + 2x - 4y = 5$  pada dua titik berbeza.

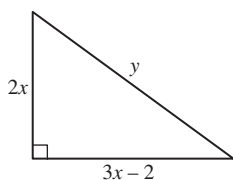
Thus, the straight line  $y = 3x - 6$  intersects the curve  $x^2 - y^2 + 2x - 4y = 5$  at two different points.

(b) Perimeter = 48

$2x + (3x - 2) + y = 48$

$5x + y = 50$

$y = 50 - 5x \dots \textcircled{1}$



Dengan menggunakan teorem Pythagoras,

By using Pythagoras' theorem,

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

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

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

$$\begin{aligned} 4x^2 + 9x^2 - 12x + 4 &= (50 - 5x)^2 \\ 4x^2 + 9x^2 - 12x + 4 &= 2500 - 500x + 25x^2 \\ 12x^2 - 488x + 2496 &= 0 \\ 3x^2 - 122x + 624 &= 0 \\ (3x - 104)(x - 6) &= 0 \\ 3x - 104 = 0, x - 6 &= 0 \\ x &= \frac{104}{3}, x = 6 \end{aligned}$$

Apabila/When  $x = \frac{104}{3}$ ,

$y = 50 - 5\left(\frac{104}{3}\right) = -\frac{370}{3}$

(nilai negatif  $y$  tidak boleh terima)

(negative value of  $y$  is not accepted)

Apabila/When  $x = 6$ ,

$y = 50 - 5(6) = 20$

Panjang sisi berukuran  $y = 20$  m

Length of side of measurement  $y = 20$  m

Panjang sisi berukuran  $2x = 2(6) = 12$  m

Length of side of measurement  $2x = 2(6) = 12$  m

Panjang sisi berukuran  $3x - 2 = 3(6) - 2 = 16$  m

Length of side of measurement

$3x - 2 = 3(6) - 2 = 16$  m