Jawapan

Praktis 3

Praktis Formatif

1 Tidak, kerana terdapat 4 pemboleh ubah iaitu w, x, y dan z dalam tiga persamaan tersebut.
No, because there are 4 variables w, x, y and z in the three equations.

2 $x - 2y = 4 \ldots ①$
$3y + z = 1 \ldots ②$
$4x + y - z = 3 \ldots ③$
② + ③, $4x + 4y = 4$
$x + y = 1 \ldots ④$
④ − ①, $3y = -3$
$y = -1$
Gantikan ke dalam ①/*Substitute into* ①,
$x - 2(-1) = 4$
$x = 2$
Gantikan ke dalam ②/*Substitute into* ②,
$3(-1) + z = 1$
$z = 4$
$\therefore\ x = 2, y = -1, z = 4$

3 $3x - y + z = 1 \ldots ①$
$x + y - z = -9 \ldots ②$
$-2x + 4y + z = 6 \ldots ③$
① + ②, $4x = -8$
$x = -2$
② + ③, $-x + 5y = -3$
$-(-2) + 5y = -3$
$5y = -5$
$y = -1$
Gantikan ke dalam ②/*Substitute into* ②,
$-2 - 1 - z = -9$
$z = 6$
$\therefore\ x = -2, y = -1, z = 6$

4 $4x + 3y = 7 \ldots ①$
$2x - y + 3z = 3 \ldots ②$
$x + 5y - 2z = 15 \ldots ③$
② × 2, $4x - 2y + 6z = 6 \ldots ④$
③ × 3, $3x + 15y - 6z = 45 \ldots ⑤$
④ + ⑤, $7x + 13y = 51 \ldots ⑥$
⑥ × 4, $28x + 52y = 204 \ldots ⑦$
① × 7, $28x + 21y = 49 \ldots ⑧$
⑦ − ⑧, $31y = 155$
$y = 5$
Gantikan ke dalam ①/*Substitute into* ①,
$4x + 3(5) = 7$
$4x = -8$
$x = -2$
Gantikan ke dalam ②/*Substitute into* ②,
$2(-2) - 5 + 3z = 3$
$3z = 12$
$z = 4$
$\therefore\ x = -2, y = 5, z = 4$

5 $2x + y - 3z = 4 \ldots ①$
$x + 2y - 5z = 1 \ldots ②$
$x - y + 2z = 3 \ldots ③$
① + ③, $3x - z = 7 \ldots ④$
① × 2, $4x + 2y - 6z = 8 \ldots ⑤$
⑤ − ②, $3x - z = 7 \ldots ⑥$
④ − ⑥, $0 = 0$
$\therefore$ Penyelesaian tak terhingga/*Infinite number of solutions*

6 $2x + 4y - z = 1 \ldots ①$
$x - y + 3z = 2 \ldots ②$
$3x + 3y + 2z = 4 \ldots ③$
② × 2, $2x - 2y + 6z = 4 \ldots ④$
① − ④, $6y - 7z = -3 \ldots ⑤$
② × 3, $3x - 3y + 9z = 6 \ldots ⑥$
③ − ⑥, $6y - 7z = -2 \ldots ⑦$
⑤ − ⑦, $0 = -1$
$\therefore$ Tiada penyelesaian/*No solution*

7 $x + y + z = 20$
$1x + 0.8y + 1.2z = 19.8$
$\times 5, 5x + 4y + 6z = 99$
$x - 2y = 5$

8 (a) $x + y + z = 23 \ldots ①$
$2x + 6y + 5z = 102 \ldots ②$
$4x + 3y + 7z = 93 \ldots ③$
(b) ① × 2, $2x + 2y + 2z = 46 \ldots ④$
② − ④, $4y + 3z = 56 \ldots ⑤$
④ × 2, $4x + 4y + 4z = 92 \ldots ⑥$
⑥ − ③, $y - 3z = -1 \ldots ⑦$
⑤ + ⑦, $5y = 55$
$y = 11$
Gantikan ke dalam ⑦/*Substitute into* ⑦,
$11 - 3z = -1$
$3z = 12$
$z = 4$
Gantikan ke dalam ①/*Substitute into* ①,
$x + 11 + 4 = 23$
$x = 8$
$\therefore\ x = 8, y = 11, z = 4$

9 $y = 3x + 2 \ldots ①$
$y = 2x^2 + 8x - 5 \ldots ②$
Gantikan ① ke dalam ②/*Substitute* ① *into* ②,
$3x + 2 = 2x^2 + 8x - 5$
$2x^2 + 5x - 7 = 0$
$(2x + 7)(x - 1) = 0$

$x = -\frac{7}{2}, 1$

Gantikan ke dalam ①/*Substitute into* ①,

$x = -\frac{7}{2}, y = 3\left(-\frac{7}{2}\right) + 2$

$y = -\frac{17}{2}$

$x = 1,\ y = 3(1) + 2$

$y = 5$

10 $x + 2y = 2$

$x = 2 - 2y \ldots ①$

$y + 2x = 5xy \ldots ②$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

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

$y + 4 - 4y = 10y - 10y^2$

$4 - 3y = 10y - 10y^2$

$10y^2 - 13y + 4 = 0$

$(5y - 4)(2y - 1) = 0$

$y = \frac{4}{5}, y = \frac{1}{2}$

Gantikan ke dalam ①/*Substitute into* ①,

$y = \frac{4}{5},\ x = 2 - 2\left(\frac{4}{5}\right)$

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

$y = \frac{1}{2},\ x = 2 - 2\left(\frac{1}{2}\right)$

$x = 1$

11 $x + y = 5$

$y = 5 - x \ldots ①$

$x^2 + y^2 + 3x = 21 \ldots ②$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

$x^2 + (5 - x)^2 + 3x = 21$

$x^2 + x^2 - 10x + 25 + 3x = 21$

$2x^2 - 7x + 4 = 0$

Dengan menggunakan rumus kuadratik,
By using quadratic formula,

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

$x = \frac{7 \pm \sqrt{17}}{4}$

$x = 0.719, 2.781$

Gantikan ke dalam ①/*Substitute into* ①,

$x = 0.719,\ y = 5 - 0.719$

$y = 4.281$

$x = 2.781,\ y = 5 - 2.78$

$y = 2.219$

12 $x - \frac{y}{2} = 3$

$\times 2,\ 2x - y = 6$

$y = 2x - 6 \ldots ①$

$\frac{2}{x} + \frac{4}{y} = 1$

$\times xy,\ 2y + 4x = xy \ldots ②$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

$2(2x - 6) + 4x = x(2x - 6)$

$4x - 12 + 4x = 2x^2 - 6x$

$2x^2 - 14x + 12 = 0$

$\div 2,\ x^2 - 7x + 6 = 0$

$(x - 1)(x - 6) = 0$

$x = 1, x = 6$

Gantikan ke dalam ①/*Substitute into* ①,

$x = 1,\ y = 2(1) - 6$

$y = -4$

$x = 6,\ y = 2(6) - 6$

$y = 6$

13 $5x + 2y = 3$

$y = \frac{3 - 5x}{2} \ldots ①$

$2x^2 - 5x - y = 3 \ldots ②$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

$2x^2 - 5x - \left(\frac{3 - 5x}{2}\right) = 3$

$\times 2,\ 4x^2 - 10x - 3 + 5x = 6$

$4x^2 - 5x - 9 = 0$

$(4x - 9)(x + 1) = 0$

$x = \frac{9}{4}, x = -1$

Gantikan ke dalam ①/*Substitute into* ①,

$x = \frac{9}{4},\ y = \frac{3 - 5\left(\frac{9}{4}\right)}{2}$

$y = -\frac{33}{8}$

$x = -1,\ y = \frac{3 - 5(-1)}{2}$

$y = 4$

14 $2x - y = 1$

$y = 2x - 1 \ldots ①$

$3x + 4y - 3xy = 0 \ldots ②$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

$3x + 4(2x - 1) - 3x(2x - 1) = 0$

$3x + 8x - 4 - 6x^2 + 3x = 0$

$6x^2 - 14x + 4 = 0$

$\div 2,\ 3x^2 - 7x + 2 = 0$

$(x - 2)(3x - 1) = 0$

$x = 2, x = \frac{1}{3}$

Gantikan ke dalam ①/*Substitute into* ①,

$x = 2,\ y = 2(2) - 1$

$y = 3$

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

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

$\therefore (2, 3)$ dan/*and* $\left(\frac{1}{3}, -\frac{1}{3}\right)$

15 $2y = x + 1$

$y = \frac{x + 1}{2} \ldots ①$

$x^2 + xy = 2 \ldots ②$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

$x^2 + x\left(\frac{x+1}{2}\right) = 2$

$\times x,\ 2x^2 + x^2 + x = 4$

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

$(3x + 4)(x - 1) = 0$

$x = -\frac{4}{3},\ x = 1$

Gantikan ke dalam ①/*Substitute into* ①,

$x = -\frac{4}{3},\ y = \frac{-\frac{4}{3} + 1}{2}$

$y = -\frac{1}{6}$

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

$y = 1$

Bandingkan/*Compare x*: $p - 1 = -\frac{4}{3}$, $p - 1 = 1$

$p = -\frac{1}{3}$, $p = 2$

Bandingkan/*Compare y*: $\frac{q}{3} = -\frac{1}{6}$, $\frac{q}{3} = 1$

$q = -\frac{1}{2}$, $q = 3$

16 $2(x + 4) + 2(y + 2) = 38$

$\div 2,\ x + 4 + y + 2 = 19$

$x + y + 6 = 19$

$x = 13 - y \ldots ①$

Luas/*Area* = 84

$(x + 4)(y + 2) = 84 \ldots ②$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

$(13 - y + 4)(y + 2) = 84$

$(17 - y)(y + 2) = 84$

$34 + 15y - y^2 = 84$

$y^2 - 15y + 50 = 0$

$(y - 10)(y - 5) = 0$

$y = 5,\ y = 10$

Gantikan ke dalam ①/*Substitute into* ①,

$y = 5,\ x = 13 - 5$

$x = 8$

$y = 10,\ x = 13 - 10$

$x = 3$

$x > y,\ \therefore x = 8,\ y = 5$

Praktis Sumatif

Kertas 1

1 $3x - 2z = 9 \ldots ①$

$4x - y - z = 2 \ldots ②$

$x + y + 3z = -3 \ldots ③$

② + ③, $5x + 2z = -1 \ldots ④$

① + ④, $8x = 8$

$x = 1$

Gantikan ke dalam ①/*Substitute into* ①,

$3(1) - 2z = 9$

$2z = -6$

$z = -3$

Gantikan ke dalam ③/*Substitute into* ③,

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

$y - 8 = -3$

$y = 5$

$\therefore\ x = 1,\ y = 5,\ z = -3$

2 $x = 5 - 2y \ldots ①$

$3y + 2x = 3xy \ldots ②$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

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

$3y + 10 - 4y = 15y - 6y^2$

$10 - y = 15y - 6y^2$

$6y^2 - 16y + 10 = 0$

$\div 2,\ 3y^2 - 8y + 5 = 0$

$(3y - 5)(y - 1) = 0$

$y = \frac{5}{3},\ y = 1$

Gantikan ke dalam ①/*Substitute into* ①,

$y = \frac{5}{3},\ x = 5 - 2\left(\frac{5}{3}\right)$

$x = \frac{5}{3}$

$y = 1,\ x = 5 - 2(1)$

$x = 3$

3 (a) $x + y + z = 10$

$8x + 12y + 15z = 114$

$20x + 18y + 30z = 210$

$\div 2,\ 10x + 9y + 15z = 105$

(b) $x = 4 - y \ldots ①$

$x^2 + y^2 = 8 \ldots ②$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

$(4 - y)^2 + y^2 = 8$

$16 - 8y + y^2 + y^2 = 8$

$2y^2 - 8y + 8 = 0$

$\div 2,\ y^2 - 4y + 4 = 0$

$(y - 2)^2 = 0$

$y = 2$

Gantikan ke dalam ①/*Substitute into* ①,

$x = 4 - 2$

$= 2$

4 (a) $2x + y - z = -1 \ldots ①$

$-x + 2y + 3z = 8 \ldots ②$

$x + 3y + 2z = 7 \ldots ③$

② + ③, $5y + 5z = 15$

$y + z = 3 \ldots ④$

② × 2, $-2x + 4y + 6z = 16 \ldots ⑤$

① + ⑤, $5y + 5z = 15$

$y + x = 3 \ldots ⑥$

④ − ⑥, $0 = 0$

$\therefore$ Penyelesaian tak terhingga

Infinite number of solutions

(b) $y = x - 6 \ldots ①$

$xy + 6x - 25 = 0 \ldots ②$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

$x(x - 6) + 6x - 25 = 0$

$x^2 - 6x + 6x - 25 = 0$

$x^2 - 25 = 0$

$x^2 = 25$

$x = -5,\ x = 5$

Gantikan ke dalam ①/*Substitute into* ①,
$x = -5, y = -5 - 6$
$y = -11$
$x = 5,\ y = 5 - 6$
$y = -1$

5 (a) $4x + 2y + z = 5 \ldots ①$
$2x + 3y - 2z = 9 \ldots ②$
$6x + 5y - z = 4 \ldots ③$
① + ③, $10x + 7y = 9 \ldots ④$
① × 2, $8x + 4y + 2z = 10 \ldots ⑤$
② + ⑤, $10x + 7y = 19 \ldots ⑥$
⑥ − ④, $0 = 10$
∴ Tiada penyelesaian/*No solution*

(b) $kx + 4y = xy$
Gantikan/*Substitute* $(-2, h)$, $k(-2) + 4h = -2h$
$2k = 6h$
$k = 3h \ldots ①$
$x + ky = 10$
Gantikan/*Substitute* $(-2, h)$, $-2 + kh = 10$
$hk = 12 \ldots ②$
Gantikan ① ke dalam ②/*Substitute* ① *into* ②,
$h(3h) = 12$
$h^2 = 4$
$h > 0,\ \therefore\ h = 2$
Gantikan ke dalam ①/*Substitute into* ①,
$k = 3(2)$
$= 6$

6 (a) $x = 4y + z \ldots ①$
$2x - y + 3z = -4 \ldots ②$
$2y - 5z = 31 \ldots ③$
Gantikan ① ke dalam ②/*Substitute* ① *into* ②,
$2(4y + z) - y + 3z = -4$
$8y + 2z - y + 3z = -4$
$7y + 5z = -4 \ldots ④$
③ + ④, $9y = 27$
$y = 3$
Gantikan ke dalam ④/*Substitute into* ④,
$7(3) + 5z = -4$
$5z = -25$
$z = -5$
Gantikan ke dalam ①/*Substitute into* ①,
$x = 4(3) - 5$
$= 7$
$\therefore\ x = 7, y = 3, z = -5$

(b) $s = 4t - 3 \ldots ①$
$t^2 - 5t + 2s = 7 \ldots ②$
Gantikan ① ke dalam ②/*Substitute* ① *into* ②,
$t^2 - 5t + 2(4t - 3) = 7$
$t^2 - 5t + 8t - 6 = 7$
$t^2 + 3t - 13 = 0$
Dengan menggunakan rumus kuadratik,
By using quadratic formula,
$t = \dfrac{-3 \pm \sqrt{(3)^2 - 4(1)(-13)}}{2}$
$= \dfrac{-3 \pm \sqrt{61}}{2}$
$t = -5.405,\ t = 2.405$
Gantikan ke dalam ①/*Substitute into* ①,
$t = -5.405,\ s = 4(-5.405) - 3$
$s = -24.620$
$t = 2.405,\ s = 4(2.405) - 3$
$s = 6.620$

Kertas 2

1 $3y - 2x = 8$
$2x = 3y - 8$
$x = \dfrac{3y - 8}{2} \ldots ①$
$2y + 5x + xy = 1 \ldots ②$
Gantikan ① ke dalam ②/*Substitute* ① *into* ②,
$2y + 5\left(\dfrac{3y - 8}{2}\right) + \left(\dfrac{3y - 8}{2}\right)y = 1$
$\times 2, 4y + 15y - 40 + 3y^2 - 8y = 2$
$3y^2 + 11y - 42 = 0$
$(3y - 7)(y + 6) = 0$
$y = \dfrac{7}{3}, y = -6$
Gantikan ke dalam ①/*Substitute into* ①,
$y = \dfrac{7}{3},\ x = \dfrac{3\left(\dfrac{7}{3}\right) - 8}{2}$
$x = -\dfrac{1}{2}$
$y = -6,\ x = \dfrac{3(-6) - 8}{2}$
$x = -13$

2 $x - 3y = 7$
$x = 3y + 7 \ldots ①$
$xy - 4x = 5y \ldots ②$
Gantikan ① ke dalam ②/*Substitute* ① *into* ②,
$(3y + 7)y - 4(3y + 7) = 5y$
$3y^2 + 7y - 12y - 28 = 5y$
$3y^2 - 10y - 28 = 0$
$y = \dfrac{-(-10) \pm \sqrt{(-10)^2 - 4(3)(-28)}}{2(3)}$
$= \dfrac{10 \pm \sqrt{436}}{6}$
$y = -1.813,\ y = 5.147$
Gantikan ke dalam ①/*Substitute into* ①,
$y = -1.813,\ x = 3(-1.813) + 7$
$= 1.561$
$y = 5.147,\ x = 3(5.147) + 7$
$= 22.441$

3 $2x - 2y + z = 15 \ldots ①$
$3x + y + z = 11 \ldots ②$
$5x + 3y + 2z = 14 \ldots ③$
② − ①, $x + 3y = -4 \ldots ④$
② × 2, $6x + 2y + 2z = 22 \ldots ⑤$
⑤ − ③, $x - y = 8 \ldots ⑥$
④ − ⑥, $4y = -12$
$y = -3$

Gantikan ke dalam ①/*Substitute into* ①,

$x + 3(-3) = -4$

$x = 5$

Gantikan ke dalam ①/*Substitute into* ①,

$2(5) - 2(-3) + z = 15$

$16 + z = 15$

$z = -1$

$\therefore\ x = 5, y = -3, z = -1$

4 $3x + 2y - 5z = 8 \ldots ①$

$x + 4y - 2z = 12 \ldots ②$

$6x - 2y + z = 20 \ldots ③$

$① + ③, 9x - 4z = 28 \ldots ④$

$① \times 2, 6x + 4y - 10z = 16 \ldots ⑤$

$⑤ - ②, 5x - 8z = 4 \ldots ⑥$

$④ \times 2, 18x - 8z = 56 \ldots ⑦$

$⑦ - ⑥, 13x = 52$

$x = 4$

Gantikan ke dalam ④/*Substitute into* ④,

$9(4) - 4z = 28$

$4z = 8$

$z = 2$

Gantikan ke dalam ①/*Substitute into* ①,

$3(4) + 2y - 5(2) = 8$

$2 + 2y = 8$

$2y = 6$

$y = 3$

$\therefore\ x = 4, y = 3, z = 2$

5 Jumlah panjang sisi/*Total length of edges* = 76

$4x + 4y + 4(8) = 76$

$\div 4, x + y + 8 = 19$

$x = 11 - y \ldots ①$

Isi padu/*Volume* = 220

$8xy = 220$

$\div 4, 2xy = 55 \ldots ②$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

$2(11 - y)y = 55$

$22y - 2y^2 = 55$

$2y^2 - 22y + 55 = 0$

Dengan menggunakan rumus kuadratik,
By using quadratic formula,

$$y = \frac{-(-22) \pm \sqrt{(-22)^2 - 4(2)(55)}}{2(2)}$$

$$= \frac{22 \pm \sqrt{44}}{4}$$

Gantikan ke dalam ①/*Substitute into* ①,

$y = 3.84, x = 11 - 3.84$

$x = 7.16$

$y = 7.16, x = 11 - 7.16$

$x = 3.84$

6 Perimeter = 46

$$2 \times \frac{22}{7}x + 2y = 46$$

$$2y = 46 - \frac{44}{7}x$$

$$y = 23 - \frac{22}{7}x \ldots ①$$

Isi padu/*Volume* = 245

$$\left(\frac{22}{7}x^2 + 2xy\right) \times 2 = 245$$

$$\frac{44}{7}x^2 + 4xy = 245 \ldots ②$$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

$$\frac{44}{7}x^2 + 4x\left(23 - \frac{22}{7}x\right) = 245$$

$$\frac{44}{7}x^2 + 92x - \frac{88}{7}x^2 = 245$$

$$\frac{44}{7}x^2 - 92x + 245 = 0$$

$44x^2 - 644x + 1\,715 = 0$

$(22x - 245)(2x - 7) = 0$

$$x = \frac{245}{11}, x = \frac{7}{2}$$

Gantikan ke dalam ①/*Substitute into* ①,

$$x = \frac{245}{22}, y = 23 - \frac{22}{7}\left(\frac{245}{22}\right)$$

$= -12$ (tidak sah/*invalid*)

$$x = \frac{7}{2}, y = 23 - \frac{22}{7}\left(\frac{7}{2}\right)$$

$y = 12$

7 (a) $x + y + z = 24 \ldots ①$

$60x + 40y + 80z = 1\,400$

$\div 20, 3x + 2y + 4z = 70 \ldots ②$

$x - 2z = 2 \ldots ③$

(b) $① \times 2, 2x + 2y + 2z = 48 \ldots ④$

$② - ④, x + 2z = 22 \ldots ⑤$

$③ + ⑤, 2x = 24$

$x = 12$

Gantikan ke dalam ⑤/*Substitute into* ⑤,

$12 + 2z = 22$

$2z = 10$

$z = 5$

Gantikan ke dalam ①/*Substitute into* ①,

$12 + y + 5 = 24$

$y = 7$

$\therefore\ x = 12, y = 7, z = 5$

8 (a) $x + y + z = 100 \ldots ①$

$280\,000x + 350\,000y + 490\,000z = 35\,700\,000$

$\div 70\,000, 4x + 5y + 7z = 510 \ldots ②$

$600x + 900y + 1\,200z = 87\,000$

$\div 300, 2x + 3y + 4z = 290 \ldots ③$

(b) $① \times 2, 2x + 2y + 2z = 200 \ldots ④$

$③ - ④, y + 2z = 90 \ldots ⑤$

$④ \times 2, 4x + 4y + 4z = 400 \ldots ⑥$

$② - ⑥, y + 3z = 110 \ldots ⑦$

$⑦ - ⑤, z = 20$

Gantikan ke dalam ⑤/*Substitute into* ⑤,

$y + 2(20) = 90$

$y = 50$

Gantikan ke dalam ①/*Substitute into* ①,

$x + 50 + 20 = 100$

$x = 30$

$\therefore\ x = 30, y = 50, z = 20$