Penyelesaian Lengkap

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 $x - 2y = 4 \ldots ①$
$3y + z = 1 \ldots ②$
$4x + y - z = 3 \ldots ③$
$② + ③, 4x + 4y = 4$
$x + y = 1 \ldots ④$
$④ - ①, \quad 3y = -3$
$y = -1$
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 $4x + 3y = 7 \ldots ①$
$2x - y + 3z = 3 \ldots ②$
$x + 5y - 2z = 15 \ldots ③$
$② \times 2, 4x - 2y + 6z = 6 \ldots ④$
$③ \times 3, 3x + 15y - 6z = 45 \ldots ⑤$
$④ + ⑤, 7x + 13y = 51 \ldots ⑥$
$⑥ \times 4, 28x + 52y = 204 \ldots ⑦$
$① \times 7, 28x + 21y = 49 \ldots ⑧$
$⑦ - ⑧, 31y = 155$
$y = 5$
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 $2x + y - 3z = 4 \ldots ①$
$x + 2y - 5z = 1 \ldots ②$
$x - y + 2z = 3 \ldots ③$
$① + ③, 3x - z = 7 \ldots ④$
$① \times 2, 4x + 2y - 6z = 8 \ldots ⑤$
$⑤ - ②, 3x - z = 7 \ldots ⑥$
$④ - ⑥, 0 = 0$
$\therefore$ Penyelesaian tak terhingga/*Infinite number of solutions*

6 $2x + 4y - z = 1 \ldots ①$
$x - y + 3z = 2 \ldots ②$
$3x + 3y + 2z = 4 \ldots ③$
$② \times 2, 2x - 2y + 6z = 4 \ldots ④$
$① - ④, 6y - 7z = -3 \ldots ⑤$
$② \times 3, 3x - 3y + 9z = 6 \ldots ⑥$
$③ - ⑥, 6y - 7z = -2 \ldots ⑦$
$⑤ - ⑦, 0 = -1$
$\therefore$ 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) $① \times 2, 2x + 2y + 2z = 46 \ldots ④$
$② - ④, 4y + 3z = 56 \ldots ⑤$
$④ \times 2, 4x + 4y + 4z = 92 \ldots ⑥$
$⑥ - ③, y - 3z = -1 \ldots ⑦$
$⑤ + ⑦, 5y = 55$
$y = 11$
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,

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

$y = 4.281$

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

$y = 2.219$

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,

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

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

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

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

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

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, $5y + 5z = 15$

$y + z = 3 \ldots$ ⑥

④ − ⑥, $0 = 0$

∴ 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) $4x + 2y + z = 5 \ldots ①$
$2x + 3y - 2z = 9 \ldots ②$
$6x + 5y - z = 4 \ldots ③$
$① + ③, 10x + 7y = 9 \ldots ④$
$① \times 2, 8x + 4y + 2z = 10 \ldots ⑤$
$② + ⑤, 10x + 7y = 19 \ldots ⑥$
$⑥ - ④, 0 = 10$
$\therefore$ 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) $qx - 3y + z = 10$
Gantikan/*Substitute* $(2, p, 3)$,
$2q - 3p + 3 = 10$
$2q = 3p + 7$
$q = \dfrac{3p + 7}{2} \ldots ①$
$4x + y + 3z = r$
Gantikan/*Substitute* $(2, p, 3)$,
$4(2) + p + 3(3) = r$
$r = p + 17 \ldots ②$
$x + 4y + qz = 4$
Gantikan/*Substitute* $(2, p, 3)$,
$2 + 4p + 3q = 4$
$4p + 3q = 2 \ldots ③$
Gantikan ① ke dalam ③/*Substitute ① into ③*,
$4p + 3\left(\dfrac{3p + 7}{2}\right) = 2$
$8p + 9p + 21 = 4$
$17p = -17$
$p = -1$
Gantikan/*Substitute into ①*, $q = \dfrac{3(-1) + 7}{2}$
$q = 2$
Gantikan/*Substitute into ②*, $r = -1 + 17$
$r = 16$

(b) $y = 2x - 1 \ldots ①$
$2x^2 + y^2 - 3x + 4y = 5 \ldots ②$
Gantikan ① ke dalam ②/*Substitute ① into ②*,
$2x^2 + (2x - 1)^2 - 3x + 4(2x - 1) = 5$
$2x^2 + 4x^2 - 4x + 1 - 3x + 8x - 4 = 5$
$6x^2 + x - 8 = 0$
Menggunakan rumus kuadratik,
Using quadratic formula,
$x = \dfrac{-1 \pm \sqrt{1^2 - 4(6)(-8)}}{2(6)} = \dfrac{-1 \pm \sqrt{193}}{12}$
$x = -1.241, x = 1.074$
Gantikan/*Substitute into ①*,
$x = -1.241, y = 2(-1.241) - 1$
$= -3.482$
$x = 1.074, y = 2(1.074) - 1$
$= 1.148$

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 $3x - 2y = 16 \ldots ①$
$y + 4z = 10 \ldots ②$
$5x + 3y - 2z = 8 \ldots ③$
Daripada/*From ②*, $y = 10 - 4z \ldots ④$
Gantikan ④ ke dalam ①/*Substitute ④ into ①*,
$3x - 2(10 - 4z) = 16$
$3x - 20 + 8z = 16$
$3x + 8z = 36 \ldots ⑤$
Gantikan ④ ke dalam ③/*Substitute ④ into ③*,
$5x + 3(10 - 4z) - 2z = 8$
$5x + 30 - 12z - 2z = 8$
$5x - 14z + 30 = 8$
$5x = 14z - 22$
$x = \dfrac{14z - 22}{5} \ldots ⑥$

Gantikan ⑥ ke dalam ⑤/*Substitute ⑥ into ⑤*,

$3\left(\frac{14z-22}{5}\right)+8z=36$

$42z-66+40z=180$

$82z=246$

$z=3$

Gantikan ke dalam ⑥/*Substitute into ⑥*,

$x=\frac{14(3)-22}{5}=4$

Gantikan ke dalam ④/*Substitute into ④*,

$y=10-4(3)=-2$

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

4 $4x-2y-3z=5$ … ①

$3x+4y+2z=27$ … ②

$2x+5y-z=32$ … ③

③ × 2, $4x+10y-2z=64$ … ④

② + ④, $7x+14y=91$

÷7, $x+2y=13$ … ⑤

③ × 3, $6x+15y-3z=96$ … ⑥

⑥ − ①, $2x+17y=91$ … ⑦

⑤ × 2, $2x+4y=26$ … ⑧

⑦ − ⑧, $13y=65$

$y=5$

Gantikan ke dalam ⑤/*Substitute into ⑤*,

$x+2(5)=13$

$x=3$

Gantikan ke dalam ③/*Substitute into ③*,

$2(3)+5(5)-z=32$

$31-z=32$

$z=-1$

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

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

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

÷ 4, $x+y+8=19$

$x=11-y$ … ①

Isi padu/*Volume* = 220

$8xy=220$

÷ 4, $2xy=55$ … 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,

$y=\frac{-(-22)\pm\sqrt{(-22)^2-4(2)(55)}}{2(2)}=\frac{22\pm\sqrt{44}}{4}$

$y=3.84, 7.16$

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

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

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

$y=23-\frac{22}{7}x$ … ①

Isi padu/*Volume* = 245

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

$\frac{44}{7}x^2+4xy=245$ … 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) $x+y+z=24$ … ①

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

÷ 20, $3x+2y+4z=70$ … ②

$x-2z=2$ … ③

(b) ① × 2, $2x+2y+2z=48$ … ④

② − ④, $x+2z=22$ … 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) $x+y+z=100$ … ①

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

÷ 70 000, $4x+5y+7z=510$ … ②

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

÷ 300, $2x+3y+4z=290$ … ③

(b) ① × 2, $2x+2y+2z=200$ … ④

③ − ④, $y+2z=90$ … ⑤

④ × 2, $4x+4y+4z=400$ … ⑥

② − ⑥, $y+3z=110$ … 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*,

$x+50+20=100$

$x=30$

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