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Tentukan penyelesaian sistem persamaan berikut.

1) $2x + y + z = 12$ .... (1)
$x + 2y - z = 3$ .... (2)
$x + y - z = 6$ .... (3)

* Eliminasi persamaan 1 dan 2

$2x + y + z = 12$
$x + 2y - z = 3$ +
$3x + 3y = 15$ .... (4).

* Eliminasi persamaan 1 dan 3

$2x + y + z = 12$
$x + y - z = 6$ +
$3x + 2y = 18$ .... (5).

* Subtitusi dari persamaan 4 dan 5

$3x + 3y = 15$	$\times 1$	$3x + 3y = 15$
$3x + 2y = 18$	$\times -1$	$-3x - 2y = -18$ +
		$y = -3$

* nilai x, y, ke persamaan 1

$2x + y + z = 12$
$2(8) + (-3) + z = 12$
$z = 12 - 13$
$z = -1$

* nilai y ke persamaan 4.

$3x + 3y = 15$
$3x + 3(-3) = 15$
$x = \frac{15+9}{3} = \frac{24}{3} = 8$

Maka HP nya adalah $(x, y, z) = (8, -3, -1)$.

2) $x + y + z = 2$ ... (1)
$3x - y + 2z = 4$ .... (2)
$3x - y + z = 11$ ... (3)

* Eliminasi persamaan 1 dan 2

$x + y + z = 2$
$3x - y + 2z = 4$ +
$4x + 3z = 6$ .... (4)

* Eliminasi persamaan 1 dan 3

$x + y + z = 2$
$3x - y + z = 11$ +
$4x + 2z = 13$ .... (5).

* Eliminasi persamaan 4 dan 5

$4x + 3z = 6$
$4x + 2z = 13$ -
$z = -7$ ... (6)

* Eliminasi pers. 6 ke 4.

$4x + 3z = 6$
$4x + 3(-7) = 6$
$4x = 6 - 21$
$x = \frac{27}{4}$ ... (7).

* nilai z, x ke persamaan 1

$x + y + z = 2$
$\frac{27}{4} + y + (-7) = 2$
$y = 9 - \frac{27}{4} = \frac{36 - 27}{4} = \frac{9}{4}$

Maka HP $(x, y, z) = \left(\frac{27}{4}, \frac{9}{4}, -7\right)$

3) $3x - 4y + 4z = 17$ ... (1)

$5x + y + 2z = 21$ ... (2)

$2x + 2y + 3z = 9$ ... (3)

Eliminasi 1 dan 2

$3x - 4y + 4z = 17$	$\times 1$	$3x - 4y + 4z = 17$
$5x + y + 2z = 21$	$\times 4$	$20x + 4y + 8z = 84$ +

$23x + 12z = 101$ ... (4)

Eliminasi 1 dan 3

$3x - 4y + 4z = 17$	$\times 1$	$3x - 4y + 4z = 17$
$2x + 2y + 3z = 9$	$\times 2$	$4x + 4y + 6z = 18$

$7x + 10z = 35$ ... (5)

Eliminasi 4 & 5 ke variabel z

$23x + 12z = 101$	$\times 5$	$115x + 60z = 505$
$7x + 10z = 35$	$\times 6$	$42x + 60z = 210$ -

$x = \frac{295}{73}$

Eliminasi 4 & 5 ke variabel x

$23x + 12z = 101$	$\times 7$	$161x + 84z = 707$
$7x + 10z = 35$	$\times 23$	$161x + 230z = 805$ -

$146z = -98$

$z = \frac{98}{73} = \frac{49}{73}$

Eliminasi pers. 1 dan 2.

$3x - 4y + 4z = 17$	$\times 5$	$15x - 20y + 20z = 85$
$5x + y + 2z = 21$	$\times 3$	$15x + 3y + 6z = 63$ -

$-23y + 14z = 22$

Eliminasi pers 2 dan 3

$2x + 2y + 3z = 9$	$\times 5$	$10x + 10y + 15z = 45$
$5x + y + 2z = 21$	$\times 2$	$10x + 2y + 4z = 42$ -

$8y + 11z = 3$

Eliminasi variabel z

$-23y + 14z = 22$	$\times 11$	$-253y + 154z = 242$
$8y + 11z = 3$	$\times 14$	$112y + 154z = 42$ -

$365y = 200$

$y = -\frac{200}{365} = -\frac{40}{73}$

HP $\left(\frac{295}{73}, \frac{-40}{73}, \frac{49}{73}\right)$.

4) $a + b + 2c = 3$ .... (1)

$9a + 2b + c = 9$ .... (2)

$2a + b - 2c = 2$ .... (3)

Dari persamaan 1 & 2 Eliminasi a

$a + b + 2c = 3$ $\times 9$ $\quad 9a + 9b + 18c = 27$

$9a + 2b + c = 9$ $\times 1$ $\quad 9a + 2b + c = 9$

$7b + 17c = 18$ ... (4)

Dari pers 2 & 3 Eliminasi a.

$9a + 2b + c = 9$ $\times 1$ $\quad 9a + 2b + c = 9$

$2a + b - 2c = 2$ $\times 2$ $\quad 4a + 2b - 4c = 4$

$5c = 5$

$c = 1$

Subtitusi

$2b + 7c = 3$

$2b + 7(1) = 3$

$2b = 3 - 7$

$b = \frac{-4}{2} = -2$

HP $(3, -2, 1)$.

* Subtitusi

$a + b + 2c = 3$

$a + (-2) + 2(1) = 3$

$a - 2 + 2 = 3$

$a = 3 + 2 - 2$

$a = 3$

5) $u - 2v + w = 2$ .... (1)

$3u + 4v + 2w = 6$ .... (2)

$5u - 6v + w = 4$ .... (3)

dari persamaan 1 dan 2

$u - 2v + w = 2$	$\times(-2)$	$-2u + 4v - 2w = -4$	
$3u + 4v + 2w = 6$	$\times 1$	$3u + 4v + 2w = 6$	+
		$5u + 8v = 2$ .... (4)	

Dari persamaan 1 dan 3

$u - 2v + w = 2$	$\times 1$	$u - 2v + w = 2$	
$5u - 6v + w = 4$	$\times -1$	$-5u + 6v - w = -4$	+
		$-4u + 4v = -2$ ... (5)	

Dari persamaan 4 dan 5

$5u + 8v = 2$	$\times 4$	$20u + 32v = 8$	
$-4u + 4v = -2$	$\times 1$	$-4u + 4v = -2$	+
		$36v = 6$	
		$v = 1/6$	

dari persamaan 5 * nilai v

$-4u + 4v = -2$

$-4u + 4(1/6) = -2$

$-4u = -2 - 2/3$

$-4u = \frac{-6-2}{3}$

$-4u = -8/3$

$u = 2/3$

$u - 2v + w = 2$

$2/3 - 2(1/6) + w = 2$

$w = 6/3 - 1/3$

$w = 5/3$

HP $(u, v, w) = (2/3, 1/6, 5/3)$

c) $P + Q + r = 6 \ldots (1)$

$3P - 2Q - r = 11 \ldots (2)$

$P + 2Q + 3r = 11 \ldots (3)$

Persamaan 1 dan 2

$P + Q + r = 6$	$\times 3$	$3P + 3Q + 3r = 18$
$3P - 2Q - r = 11$	$\times 1$	$3P - 2Q - r = 11$ −
		$5Q + 4r = 7 \ldots (4)$

Pers 2 dan 3

$3P - 2Q - r = 11$	$\times 1$	$3P - 2Q - r = 11$
$P + 2Q + 3r = 11$	$\times 3$	$3P + 6Q + 9r = 33$ −
		$8Q - 10r = -22 \ldots (5)$

Pers 4 dan 5

$5Q + 4r = 7$	$\times 8$	$40Q + 32r = 56$
$-8Q - 10r = -22$	$\times 5$	$-40Q - 50r = -110$ +
		$-18r = -54$
		$r = 3$

dari pers. 4 ke r

$5Q + 4r = 7$

$5Q + 4(3) = 7$

$5Q + 12 = 7$

$5Q = 7 - 12$

$Q = -1$

dari nilai r, Q ke pers. 1

$P + Q + r = 6$

$P + (-1) + 3 = 6$

$P = 6 - 3 + 1$

$P = 4$

HP $(P, Q, R) = (4, -1, 3)$.