

Tugas Kalkulus

Kelompok 3

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Sistem Persamaan Linear Tiga Variabel (6-10)

$$\begin{aligned} 6. \quad & P + q + r = 6 \\ & 3p - 2q - r = 11 \\ & p + 2q + 3r = 11 \end{aligned}$$

$$\begin{aligned} * \quad & P + q + r = 6 \\ & p + 2q + 3r = 11 \\ \hline & -q - 2r = -5 \end{aligned}$$

$$\begin{array}{l|l} 3p - 2q - r = 11 & \times 1 \\ p + q + r = 6 & \times 3 \\ \hline 3p - 2q - r = 11 \\ 3p + 3q + 3r = 18 \\ \hline -5q - 4r = -7 \end{array}$$

$$\begin{array}{l|l} -q - 2r = -5 & \times 4 \\ -5q - 4r = -7 & \times 2 \\ \hline -4q - 8r = -20 \\ -10q - 8r = -14 \\ \hline 6q = -6 \\ q = \frac{-6}{6} = -1 \end{array}$$

$$* -q - 2r = -5$$

$$-(-1) - 2r = -5$$

$$1 - 2r = -5$$

$$-2r = -5 - 1$$

$$-2r = -6$$

$$r = \frac{-6}{-2} = 3$$

$$* \quad P + q + r = 6$$

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

$$p = 6 + 1 - 3$$

$$p = 4$$

Jadi, $P = 4$, $q = -1$, dan $r = 3$

$$7. \quad xyz \quad xy, 21 : 2-10+1$$

$$x + y + z = 12 \dots \textcircled{1}$$

$$\frac{x+y}{z} = x \rightarrow 10x+y=4z \rightarrow 10x+y-4z=0 \dots \textcircled{2}$$

$$\frac{yz}{x} = 23 \rightarrow 10y+z=23x \rightarrow -23x+10y+z=0 \dots \textcircled{3}$$

* Persamaan 2 dan 3

$$\textcircled{2} \quad \begin{array}{r|l} \times 10 & 100x + 10y - 40z = 0 \\ \times 1 & -23x + 10y + z = 0 \end{array}$$

$$\textcircled{3} \quad \begin{array}{r|l} \times 1 & -23x + 10y + z = 0 \end{array}$$

$$123x - 41z = 0$$

$$3x - z = 0$$

$$\boxed{3x = z}$$

$$\rightarrow 3(2) = z$$

$$6 = z$$

$$\underline{\underline{6}}$$

* Persamaan 1 dan 2

$$\textcircled{1} \quad x + y + z = 12$$

$$\textcircled{2} \quad 10x + y - 4z = 0$$

$$-9x + 5z = 12$$

$$-9x + 5(3x) = 12$$

$$-9x + 15x = 12$$

$$6x = 12$$

$$x = \frac{12}{6} \rightarrow \underline{\underline{2}}$$

$$\rightarrow 2 + y + 6 = 12$$

$$y + 8 = 12$$

$$y = 12 - 8 \rightarrow \underline{\underline{4}}$$

8.

$$8 \cdot \left(\frac{1}{5} + \frac{1}{4} + \frac{1}{3}\right)x = 49$$

$$\left(\frac{12}{60} + \frac{15}{60} + \frac{20}{60}\right)x = 49$$

$$\frac{47}{60}x = 49$$

$$x = \frac{49 \times 60}{47}$$

$$x = 62,6 \text{ (Pembulatan)}$$

Jadi, panjang masing-masing benang:

$$\frac{1}{5} \times 62,6 = 12,52$$

$$\frac{1}{4} \times 62,6 = 15,65$$

$$\frac{1}{3} \times 62,6 = 20,86$$

~~$$9. \quad 1. \text{ untuk titik } (-1, 5): \quad 5 = a(-1)^2 + b(-1) + c$$~~

~~$$5 = a - b + c \quad \textcircled{1}$$~~

~~$$2. \text{ untuk titik } (1, -3): \quad -3 = a(1)^2 + b(1) + c$$~~

~~$$-3 = a + b + c \quad \textcircled{2}$$~~

~~$$3. \text{ untuk titik } (2, 2): \quad 2 = a(2)^2 + b(2) + c$$~~

~~$$2 = 4a + 2b + c \quad \textcircled{3}$$~~

9. $y = ax^2 + bx + c$

titik = $(-1, 5)$, $(1, -3)$, dan $(2, 2)$

* untuk $(-1, 5)$

$$y = ax^2 + bx + c$$

$$5 = a(-1)^2 + b(-1) + c$$

$$5 = a - b + c \quad \dots (1)$$

* untuk $(1, -3)$

$$-3 = a(1)^2 + b(1) + c$$

$$-3 = a + b + c \quad \dots (2)$$

* untuk $(2, 2)$

$$2 = a(2)^2 + b(2) + c$$

$$2 = 4a + 2b + c \quad \dots (3)$$

* Eliminasi pers 1 dan 2

$$5 = a - b + c$$

$$-3 = a + b + c$$

$$\underline{8 = -2b}$$

$$\frac{8}{-2} = b$$

$$\underline{\underline{-4 = b}}$$

* Substitusi a dan b ke pers 1

$$5 = -5 - 4 + c$$

$$5 = -9 + c$$

$$\underline{\underline{14 = c}}$$

* Eliminasi pers 1 dan 3

$$5 = a - b + c$$

$$2 = 4a + 2b + c$$

$$3 = -3a - 3b \quad \dots (4)$$

* Substitusi $b = -4$

$$3 = -3a - 3(-4)$$

$$3 = -3a - 12$$

$$15 = -3a$$

$$\frac{15}{-3} = a$$

$$\underline{\underline{-5 = a}}$$

Jadi, persamaan $y = ax^2 + bx + c$

$$\underline{\underline{y = -5x^2 - 4x + 14}}$$

10. Lingkaran $x^2 + y^2 + ax + by + c = 0$

titik = $(-1, 5)$, $(-2, 4)$ dan $(5, -3)$

* untuk $(-1, 5)$

$$(-1)^2 + (5)^2 + a(-1) + b(5) + c = 0$$

$$1 + 25 - a + 5b + c = 0$$

$$-a + 5b + c = -26 \quad \dots (1)$$

* untuk $(-2, 4)$

$$(-2)^2 + (4)^2 + a(-2) + b(4) + c = 0$$

$$4 + 16 - 2a + 4b + c = 0$$

$$-2a + 4b + c = -20 \quad \dots (2)$$



* untuk $(5, -3)$

$$(5)^2 + (-3)^2 + a(5) + b(-3) + c = 0$$

$$25 + 9 + 5a - 3b + c = 0$$

$$5a - 3b + c = -34 \quad \text{--- (3)}$$

* Eliminasi pers. 1 dan 2

$$-a + 5b + c = -26$$

$$-2a + 4b + c = -20$$

$$\hline a + b = -6$$

$$a = -b - 6 \quad \text{--- (4)}$$

* Substitusi pers. 4 ke 3

$$5(-b-6) - 3b + c = -34$$

$$-5b - 30 - 3b + c = -34$$

$$-8b + c = -4 \quad \text{--- (5)}$$

* Substitusikan pers 4 ke 1

$$-(-b-6) + 5b + c = -26$$

$$b + 6 + 5b + c = -26$$

$$6b + c = -32 \quad \text{--- (6)}$$

* Eliminasi pers 5 dan 6

$$-8b + c = -4$$

$$6b + c = -32$$

$$\hline -14b = 28$$

$$b = \frac{28}{-14} = -2$$

* Substitusi b ke pers. 4

$$a = -(-2) - 6$$

$$a = -4$$

* Substitusi b ke pers. 6

$$6(-2) + c = -32$$

$$-12 + c = -32$$

$$c = -32 + 12$$

$$\boxed{\text{Jadi, persamaan } x^2 + y^2 + ax + by + c = 0 \quad C = -20}$$

$$\text{selesai } x^2 + y^2 - 4x - 2y - 20 = 0$$