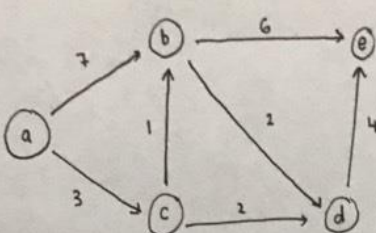


Kunci Jawaban Detect OR 2

1.

① carilah shortest path dari a ke e



di selesaikan menggunakan DIJKSTRA'S ALGORITHM

a	b	c	d	e
0*	7	3*	∞	∞
0*	4*	3*	5	∞
0*	4*	3*	5*	10
0*	4*	3*	5*	9*

cth: $\min = \begin{cases} \text{temporary label } v/\text{node } j \\ \text{permanent label node } i + \text{arc } (i,j) \end{cases}$

$\cdot \min = \begin{cases} 5 \\ 4+2 = 6 \end{cases} = 5$

shortest path:

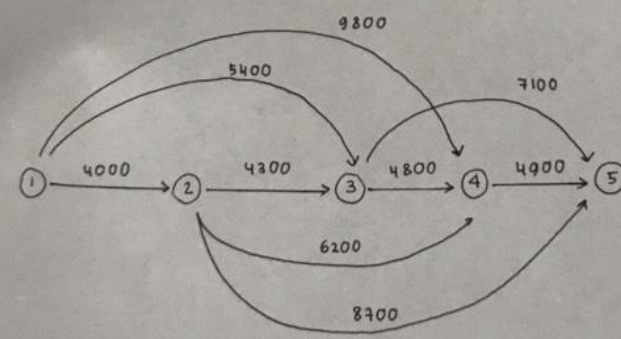
lihat e b-e 9-4 = 5 a-b-e = 6
 d-e 9-5 = 4 a-d-e = 4 ✓

lihat d b-d 5-4 = 1 a-b-d = 2
 c-d 5-3 = 2 a-c-d = 2 ✓

lihat c a-c 3-0 = 3 a-a-c = 3 ✓

→ shortest path:
 a - c - d - e
 dengan panjang 9

②



shortest: 1 - 3 - 5 → cost = 5400 + 7100 = 12500

∴ akan dibeli mobil pada tahun 1 dan tahun 3

2.

x 2 = ' node i = awal tahun ke- i
3 x untuk $i < j$
y → beli mobil baru di awal tahun i dan dipakai hingga awal tahun j
Cij = cost yang dibutuhkan

J P V

5	C12 = 4000	} pilihan jalan	0 - 1 - 2 - 3 - 4 = 18000
8	C13 = 5400		0 - 2 - 3 - 4 = 15100
3	C14 = 9800		0 - 2 - 4 = 12500
7	C23 = 4300		0 - 3 - 4 = 14700
pro)	C24 = 6200		0 - 1 - 3 - 4 = 15100
x4	C25 = 8700		0 - 1 - 4 = 12700
x1	C34 = 4800		
x2	C35 = 7100		
	C45 = 4900		

3.

Hal. 527 no. 3

Project	c/a	Ranking	Project	Sisa Uang (\$)
1	5/3	2	$x_4 = 1$	2
2	8/5	3	$x_1 = 2/3$	0
3	3/2	4	$x_2 = x_3 = 0$	
4	7/4	1		

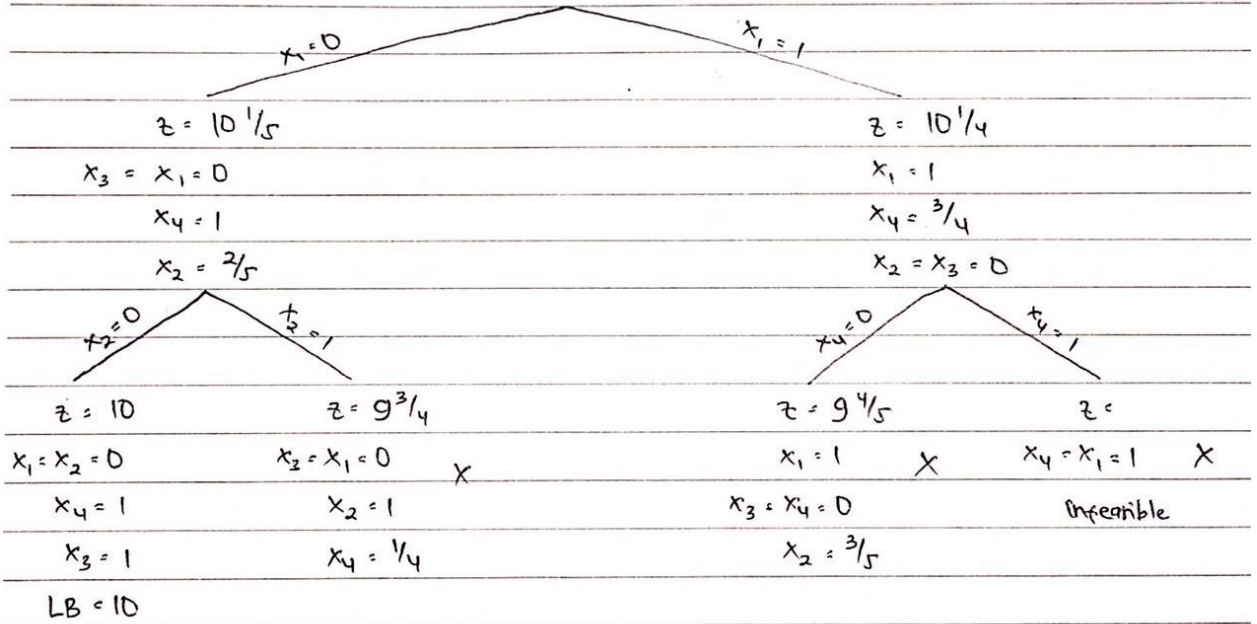
SP I

$$z = 10\frac{1}{3}$$

$$x_4 = 1$$

$$x_1 = 2/3$$

$$x_2 = x_3 = 0$$



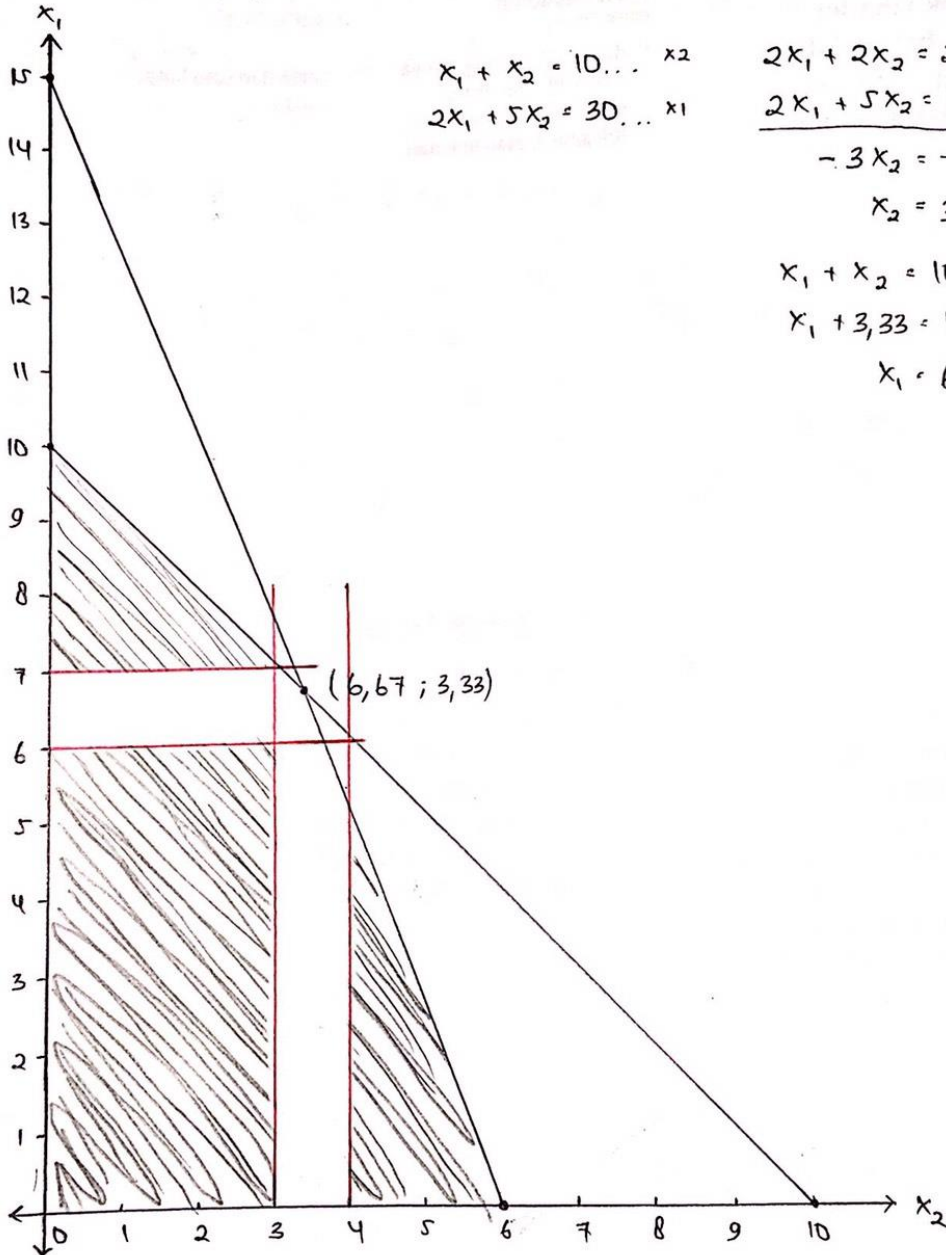
LB = 10

4.

2. $\max z = x_1 + 2x_2$
 s.t. $x_1 + x_2 \leq 10$
 $2x_1 + 5x_2 \leq 30$
 $x_1, x_2 \geq 0$; x_1, x_2 integer

x_1	0	10
x_2	10	0

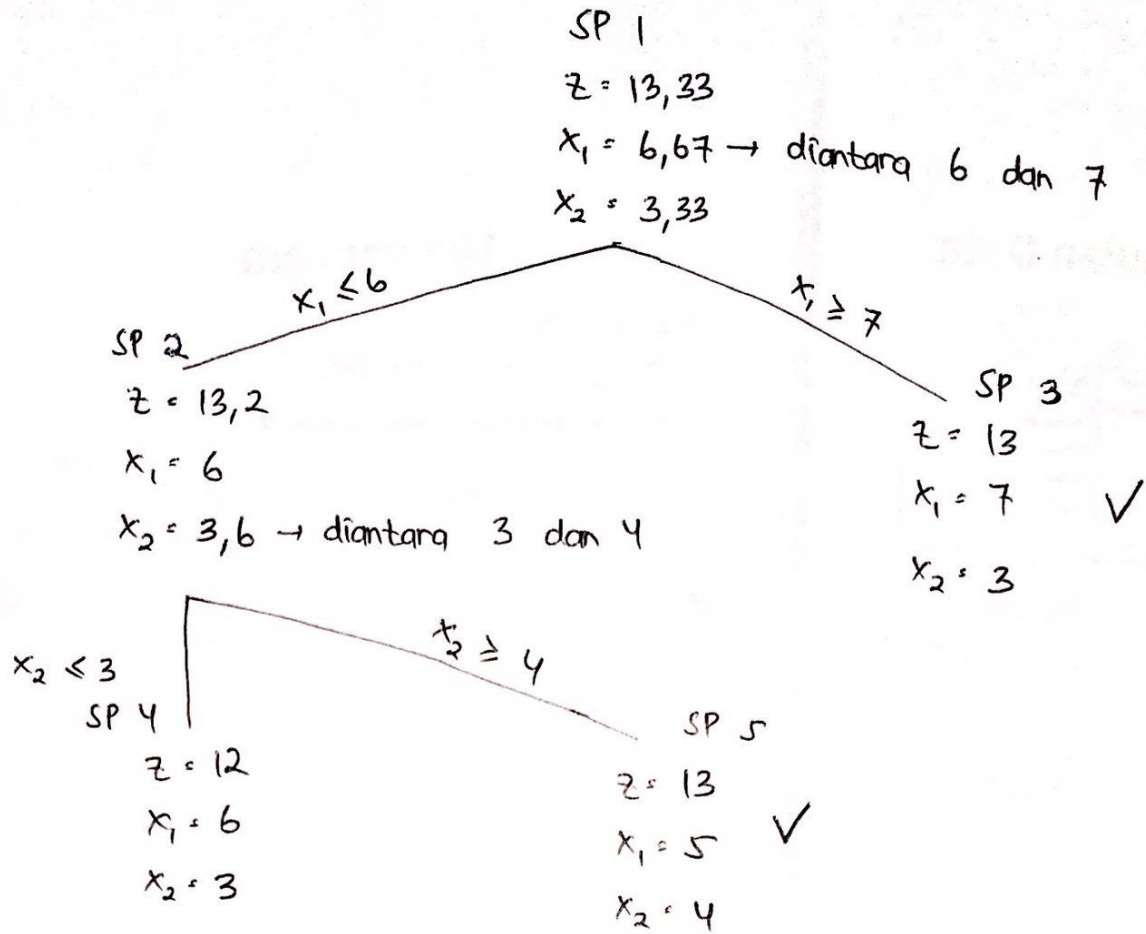
x_1	0	15
x_2	6	0



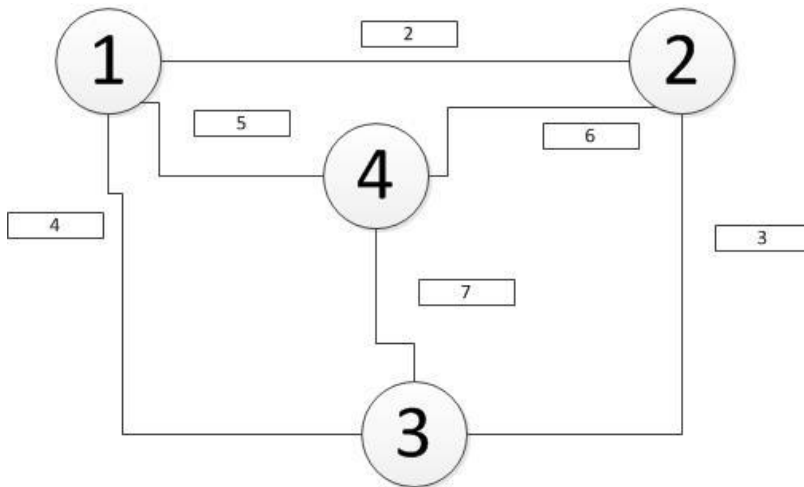
$x_1 + x_2 = 10 \dots x_2$
 $2x_1 + 5x_2 = 30 \dots x_1$

$$\begin{array}{r} 2x_1 + 2x_2 = 20 \\ 2x_1 + 5x_2 = 30 \\ \hline -3x_2 = -10 \\ x_2 = 3,33 \end{array}$$

$$\begin{array}{r} x_1 + x_2 = 10 \\ x_1 + 3,33 = 10 \\ x_1 = 6,67 \end{array}$$

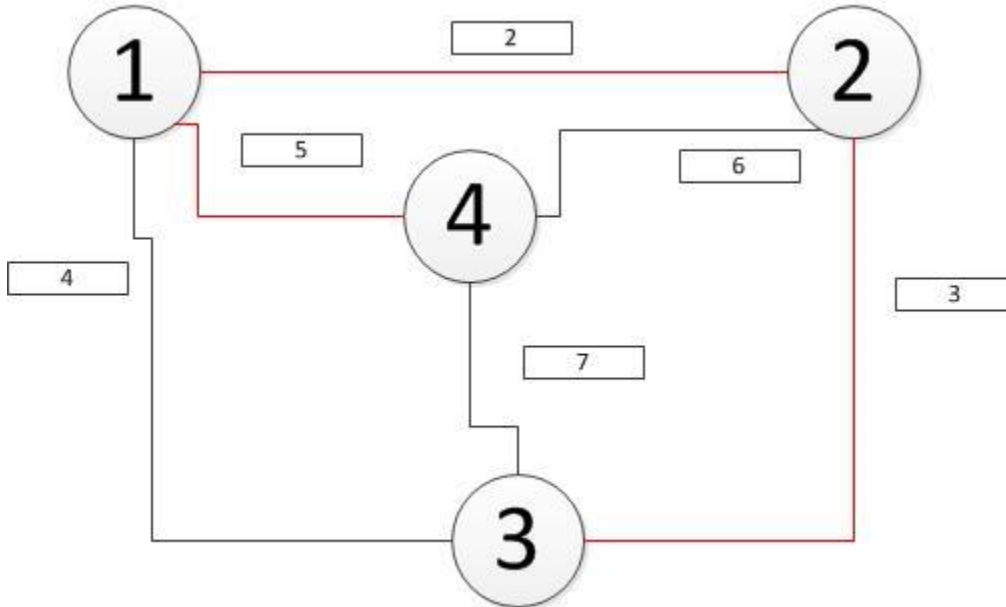


5. Minimum Spanning Tree



Pada provinsi Y, akan dipasang rel kereta api melalui rute tertentu. Rute manakah yang harus diaplikasikan agar panjang rel kereta api yang dapat menjangkau semua kota minimum?

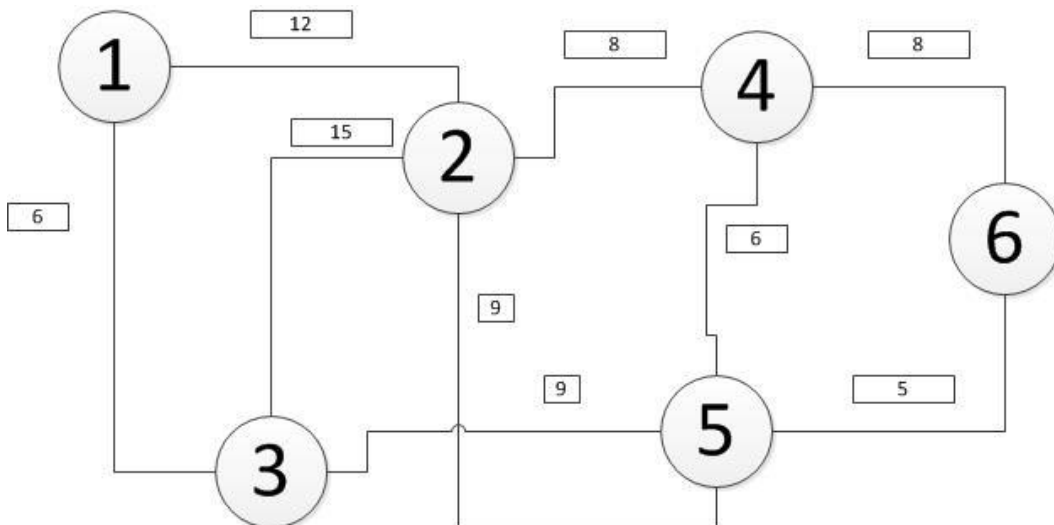
Jawaban :



Total jarak : $2+3+5 = 10$ satuan jarak

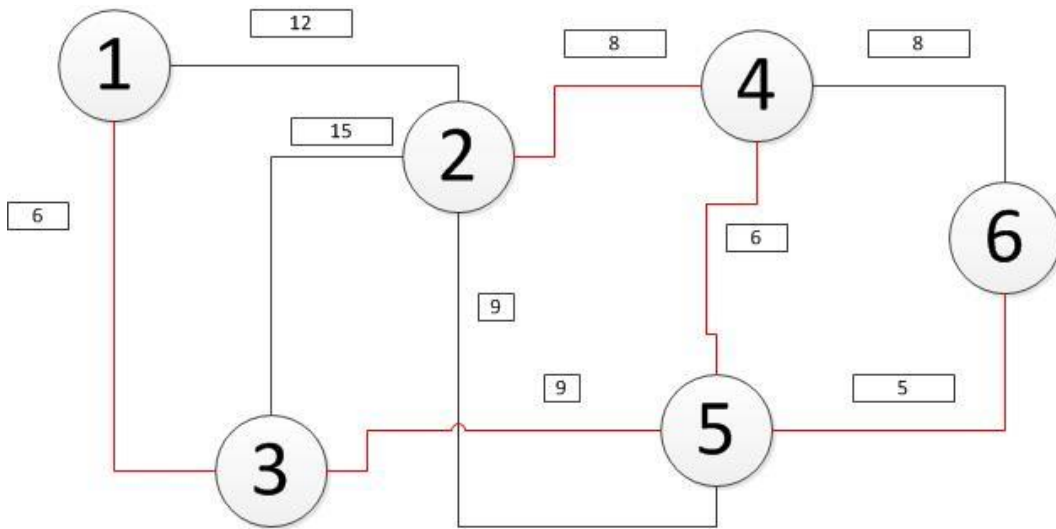
6. Soal no 6

Berikut merupakan kota-kota yang terdapat di provinsi X.



Pada provinsi X, akan dipasang kabel telepon melalui rute tertentu. Rute manakah yang harus diaplikasikan agar panjang kabel telepon minimum?

Jawaban :

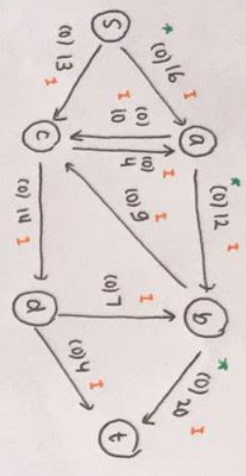


Total jarak : $6+9+8+6+5= 34$ satuan panjang

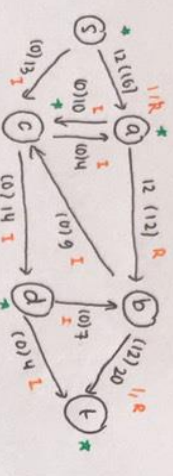
7.

2x3+4x4 or 1,3,4 flow → profit → knapsack problem

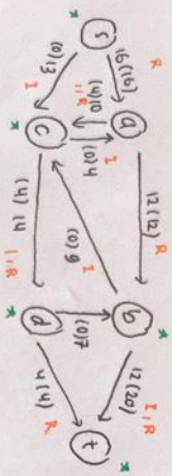
Maximum flow



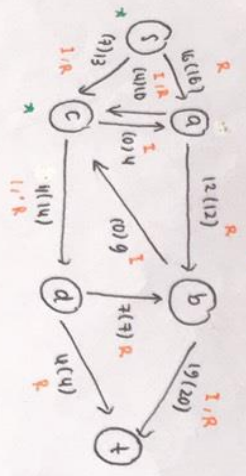
chain = (s, a), (a, b), (b, t)
 $\kappa = \min \{ 16, 12, 20 \} = 12$



chain = (s, a), (a, c), (c, d), (d, t)
 $\kappa = \min \{ 12, 10, 14, 4 \} = 4$



chain = (s, c), (c, d), (d, b), (b, t)
 $\kappa = \min \{ 13, 10, 7, 8 \} = 7$



5400h maximum
 max flow = 12 + 4 + 7
 = 23

8.

No
 Date

Hal 549

S	Z	x ₁	x ₂	s ₁	s ₂	RHS
	1	0	0	$\frac{1}{3}$	$-\frac{1}{6}$	$-\frac{1}{12}$
	0	1	0	$\frac{1}{3}$	$-\frac{1}{6}$	$-\frac{1}{12}$
	0	0	1	$\frac{1}{3}$	$-\frac{1}{6}$	$-\frac{1}{12}$

• Pilih $x_2 + \frac{1}{3}s_1 + \frac{1}{6}s_2 = \frac{1}{12}$

• $x_2 + 0s_1 + \frac{1}{3}s_1 + 0s_2 + \frac{1}{6}s_2 = 2 + \frac{1}{12}$

$x_2 + 0s_1 + 0s_2 = 2 + \frac{1}{12} - \frac{1}{3}s_1 - \frac{1}{6}s_2$

• $\frac{1}{2} - \frac{1}{3}s_1 - \frac{1}{6}s_2 \leq 0$

$-\frac{1}{3}s_1 - \frac{1}{6}s_2 + s_3 = -\frac{1}{2}$

Z	x ₁	x ₂	s ₁	s ₂	s ₃	RHS
	1	0	0	$-\frac{2}{3}$	$-\frac{1}{6}$	0
	0	1	0	$-\frac{1}{3}$	$-\frac{1}{6}$	0
	0	0	1	$\frac{1}{3}$	$\frac{1}{6}$	0
	0	0	0	$-\frac{1}{3}$	$-\frac{1}{6}$	1

• Ratio $\rightarrow s_1 : \left| \begin{array}{c} -\frac{2}{3} \\ -\frac{1}{3} \end{array} \right| : 2$

$s_2 : \left| \begin{array}{c} -\frac{1}{6} \\ -\frac{1}{6} \end{array} \right| : 5$

Z	x ₁	x ₂	s ₁	s ₂	s ₃	RHS
	1	0	0	$-\frac{1}{2}$	-2	$-\frac{13}{4}$
	0	1	0	$-\frac{1}{4}$	1	$\frac{3}{4}$
	0	0	1	0	1	2
	0	0	0	$\frac{1}{2}$	-3	$\frac{3}{2}$

• Pilih $x_1 - \frac{1}{4}s_2 + s_3 = \frac{3}{4}$

• $x_1 - 1s_2 + \frac{3}{4}s_2 + s_3 = 0 + \frac{3}{4}$

$x_1 - 1s_2 + s_3 = 0 + \frac{3}{4} - \frac{3}{4}s_2$

• $\frac{3}{4} - \frac{3}{4}s_2 \leq 0$

$-\frac{3}{4}s_2 + s_4 = -\frac{3}{4}$

Z	x ₁	x ₂	s ₁	s ₂	s ₃	s ₄	RHS
	1	0	0	$-\frac{1}{2}$	-2	0	$-\frac{13}{4}$
	0	1	0	$-\frac{1}{4}$	1	0	$\frac{3}{4}$
	0	0	1	0	1	0	2
	0	0	0	$\frac{1}{2}$	-3	0	$\frac{3}{2}$
	0	0	0	$-\frac{1}{4}$	0	1	$-\frac{3}{4}$

Z	x ₁	x ₂	s ₁	s ₂	s ₃	s ₄	RHS	→ Solusi optimal:
	1	0	0	0	-2	$-\frac{2}{3}$	-6	x ₁ = 1
	0	1	0	0	1	$-\frac{1}{3}$	1	x ₂ = 2
	0	0	1	0	1	0	2	Z = -6
	0	0	0	1	0	-3	$\frac{3}{3}$	
	0	0	0	0	1	0	$-\frac{2}{3}$	

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