

# Tugas 1

i)  $\mu = 5 \quad \sigma = 0.02$

a)  $Z = \frac{X - \mu}{\sigma} = \frac{4 - 5}{0.02} = -50$

$P(X \leq 4) = 0$

b)  $Z = \frac{X - \mu}{\sigma} = \frac{5.01 - 5}{0.02} = \frac{0.01}{0.02} = \frac{1}{2}$

$$\begin{aligned}P(X \geq 5.01) &= 1 - P(X \leq 5.01) \\&= 1 - 0.6915 \\&= 0.3085,\end{aligned}$$

c)  $Z_1 = \frac{X - \mu}{\sigma} = \frac{4.98 - 5}{0.02} = \frac{-0.02}{0.02} = -1$

$$Z_2 = \frac{X - \mu}{\sigma} = \frac{5.02 - 5}{0.02} = \frac{0.02}{0.02} = 1$$

$P(X \leq 4.98) = 0.1587$

$P(X \leq 5.02) = 0.8413$

$$\begin{aligned}P(4.98 \leq X \leq 5.02) &= P(X \leq 5.02) - P(X \leq 4.98) \\&= 0.8413 - 0.1587 \\&= 0.6826,\end{aligned}$$

d)  $Z_1 = \frac{X - \mu}{\sigma} = \frac{4.96 - 5}{0.02} = \frac{-0.04}{0.02} = -2$

$$Z_2 = \frac{X - \mu}{\sigma} = \frac{5.04 - 5}{0.02} = \frac{0.04}{0.02} = 2$$

$P(X \leq 4.96) = 0.0228$

$P(X \leq 5.04) = 0.9772$

$$\begin{aligned}P(4.96 \leq X \leq 5.04) &= P(X \leq 5.04) - P(X \leq 4.96) \\&= 0.9772 - 0.0228 \\&= 0.9544,\end{aligned}$$

2) Alternatif 1

$$\begin{aligned} E(X) &= 100M(0.8) + (-1.5M)(20)(0.2) \\ &= 80 + (-6) \\ &= 74M \end{aligned}$$

Alternatif 2

$$\begin{aligned} E(X) &= 70M(0.9) + (-0.8)(10)(0.1) \\ &= 63 + (-0.8) \\ &= 62.2M \end{aligned}$$

Nilai harapan Alternatif 1 lebih tinggi.

Jadi, alternatif yang dipilih berdasarkan nilai harapan adalah alternatif 1.

Tugas 2

1)  $\text{Max } Z = 5X_1 + 10X_2$

s.t.  $4X_1 + 2X_2 \leq 60$

$5X_1 + 8X_2 \leq 72$

$X_1, X_2 \geq 0$

✓ Metode grafik

Misalkan, (1)  $4X_1 + 2X_2 = 60$

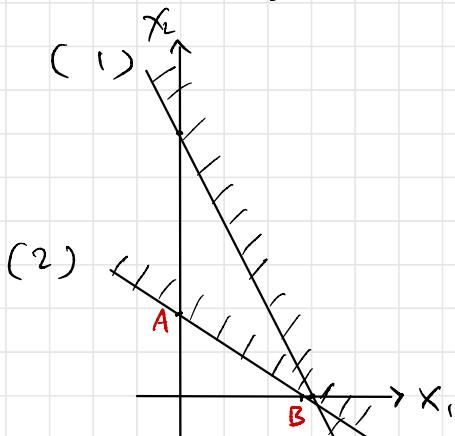
$X_1 = 0, X_2 = 30$

$X_2 = 0, X_1 = 15$

(2)  $5X_1 + 8X_2 \leq 72$

$X_1 = 0, X_2 = 9$

$X_2 = 0, X_1 = 72/5 = 14.4$



Batasan (1) dapat diwakili oleh batasan (2)

$$\begin{aligned} A \quad Z &= 5X_1 + 10X_2 \\ &= 5(0) + 10(9) \\ &= 90 \end{aligned}$$

$$\begin{aligned} B \quad Z &= 5X_1 + 10X_2 \\ &= 5(72/5) + 10(0) \\ &= 72 \end{aligned}$$

Titik A adalah solusi optimal dari permasalahan ini

✓ Metode simplex

B.V	Z	X <sub>1</sub>	X <sub>2</sub>	S <sub>1</sub>	S <sub>2</sub>	NK
Z	1	-5	-10	0	0	0
S <sub>1</sub>	0	4	2	1	0	60
S <sub>2</sub>	0	5	8	0	1	72
Z	1	5/4	0	0	5/4	90
S <sub>1</sub>	0	11/4	0	1	-1/4	42
X <sub>2</sub>	0	5/8	1	0	1/8	9

### Tugas 3

1) Stepping stone

P <sub>B</sub> \ D	D	E	F	Supply
A	10   2	5	3	10
B	5   4	20   3	7	25
C	5	2   4	18   6	20
Dm	15	22	18	

$$\begin{aligned} TC &= 10(2) + 5(4) + \\ &20(3) + 2(4) + \\ &18(6) \\ &= 216 \end{aligned}$$

2) Vogel

P <sub>B</sub> \ D	D	E	F	Supply
A	2	5	10   3	10
B	3   4	22   3	7	25
C	12   5	4	8   6	20
Dm	15	22	18	

$$\begin{aligned} TC &= 10(3) + 15(4) + \\ &10(3) + 12(4) + \\ &8(6) \\ &= 216 \end{aligned}$$

### 3) MODI

<del>P<sub>B</sub></del>	D	E	F	Supply
A	10   2	5	3	
B	5   4	20   3	7	
C	15	2   4	18   6	
Dmd	15	22	18	

$$TC = 216$$

$$R_A = 0$$

$$R_A + K_D = 4, K_D = 2$$

$$R_B + K_D = 9, R_B = 2$$

$$R_B + K_E = 3, K_E = 1$$

$$R_C + K_E = 4, R_C = 3$$

$$R_C + K_F = 6, K_F = 6$$

$$AE \rightarrow 5 - 0 - 1 = 4$$

$$AF \rightarrow 3 - 0 - 6 = -3$$

$$BF \rightarrow 7 - 2 - 6 = -1$$

$$CD \rightarrow 5 - 3 - 2 = 0$$

<del>P<sub>B</sub></del>	D	E	F	Supply
A	2	5	10   3	
B	5   4	20   3	7	
C	10   5	2   4	8   6	
Dmd	15	22	18	

$$R_A = 0$$

$$R_A + K_F = 3, K_F = 3$$

$$R_C + K_F = 6, R_C = 3$$

$$R_C + K_D = 5, K_D = 2$$

$$R_C + K_E = 4, K_E = 1$$

$$R_B + K_D = 4, R_B = 2$$

$$R_B + K_E = 3$$

$$AD = 2 - 0 - 2 = 0$$

$$AE = 5 - 0 - 1 = 4$$

$$BF = 7 - 2 - 3 = 2$$

Sudah optimal,  $TC = 216$