

BIG M

[TYPE. III]

$$\textcircled{1} \quad \text{MIN}, \quad Z = 2x_1 + 3x_2$$

$$\text{SUB}, \quad x_1 + x_2 \geq 5$$

$$x_1 + 2x_2 \geq 6$$

$$\text{WHERE } x_1, x_2 \geq 0$$

$$\text{MAX } Z' = -Z$$

$$Z' = -2x_1 - 3x_2$$

CONVERTING TO STD. FORM.

$$Z' = -2x_1 - 3x_2 + 0s_1 + 0s_2 + MA_1 + MA_2$$

$$Z' + 2x_1 + 3x_2 - 0s_1 - 0s_2 + MA_1 + MA_2 = \textcircled{1}$$

$$x_1 + x_2 - s_1 + A_1 = 5 \quad - \textcircled{2}$$

$$x_1 + 2x_2 - s_2 + A_2 = 6 \quad - \textcircled{3}$$

$$\text{WHERE } x_1, x_2, x_3, s_1, s_2, A_1, A_2 \geq 0$$

MULTIPLYING $\textcircled{2}$ AND $\textcircled{3}$ BY "M" AND
SUBTRACTING FROM $\textcircled{1}$

$$Z' + 2x_1 + 3x_2 - 0s_1 - 0s_2 + MA_1 + MA_2 = 0$$

$$Mx_1 + Mx_2 - Ms_1 + MA_1 = 5M$$

$$-Mx_1 + 2Mx_2 - Ms_2 + MA_2 = -6M$$

$$Z' + (2-2M)x_1 + (3-3M)x_2 + Ms_1 + Ms_2 = -11M$$

ITERATI. VAR. x_1 x_2 s_1 s_2 A_{12} A_2 FORMUL

O	Z'	2-2M	3-3M	M	M	0	0	-11	-
A_1	1	1	-1	0	0	1	0	5	$x - 1/2 y$
A_2	1	2	0	-1	0	1	6	3	$y/2$

I	Z'	$1 - M/2$	0	M	$3 - M/2$	0	$-3 + M/2$	$-20 + 9M$	-
A_1	1/2	0	-1	1/2	1	-1/2	2	4	
x_2	1/2	4/14	0	-1/2	0	1/2	3	6	

2	Z'	0	0	1	-1	$-1+M$	-11	-	AUPOSIT
x_1	1	0	-2	1	2	-1	4		
x_2	0	(P)	1	-1	-1	-1	1	1	

$$\min Z'' = 0 - Z' \quad \text{oder} \quad \min Z'' = 0 - Z'$$

$\min Z'' \geq 10$ mit Ausgabe von "M"

$$x_1 = 4PM + AM + s_20 + 120 + s_2x + 12x + 1$$

$$x_2 = 1 \quad 1AM + \dots + 5xH + 10xH$$

$$M = sAM + \dots + 5xH - 5xH + 10xH$$

$$s_2 = \dots + 5xH + 10xH + 12H$$

$$HSI = \dots$$

$$M = s_2H + s_2(HN - 1) + 12(HS - S) + 1$$

③ MIN, $Z = 2x_1 + x_2$

$$\text{SUB, } 3x_1 + x_2 = 3$$

$$4x_1 + 3x_2 \geq 6$$

$$-x_1 + 2x_2 \leq 13$$

WHERE $x_1, x_2 \geq 0$

$$\max_{\lambda} \gamma' = -l$$

$$\nabla h^1 = -2x_1 - x_2$$

$$x_1 + 2x_2 + x_3 + x_4 + x_5 = 0$$

$$3x_1 + x_2 + A_1 M \approx 3 \quad | -$$

$$4x_1 + 3x_2 - s_2 + A_2 = 6 \quad (3)$$

$$x_1 + 2x_2 + 5x_3 = 3 \quad \text{--- (4)}$$

MULTIPLYING ②, ③ AND ④ BY
"M" AND SUBTRACTING FROM ①

$$L' + 2x_1 + x_2 + Os_1 + Os_2 + MA_1 + MA_2 = 0$$

$$\frac{3Hx_1 + Hx_2}{3H} + MA_1 = \underline{\underline{3M}}$$

$$\frac{4Mx_1 + 3Mx_2 - Mx_2}{-} + MA_2 = 6M$$

$$\frac{Mx_1 + 2Mx_2 + Ms_3}{2^3 M}$$

$f = 12M$

$$L + (2 - 7H)x_1 + (1 - 4H)x_2 + Ms_2 \quad F = 9M$$

$$\text{FORMULA} = X - \frac{\text{self}}{\text{circle}} \cdot Y$$

Date _____

Page _____

ITERAT.	V.	x_1	x_2	s_2	s_3	A_1	A_2	Σ	$\frac{\partial}{\partial X}$	FORMULA

O	Z'	2-7M	1-4M	M	0	0	0	-9M	$-X - 2 - 7Y/3 \cdot Y$
	A_1	3	1	0	0	10	5	3	$Y/3$
	A_2	4	3	-1	0	0	1	6	$X - (3/4) \cdot Y$
	S_3	1	2	0	1	0	0	3	$X - 1/3 \cdot Y$

M

I	Z'	0	$1-5Y/3$	$24M/3$	0	$-24M/3$	1	0	$-2-2M$	$-X$
	x_1	1	$1/3$	$1/3$	0	$1/3$	0	$1/3$	$1/3$	$1/3$
	A_2	0	$5/3$	$-7/3$	0	$-4/3$	1	$8/3$	$2/3$	$5/3$
	S_3	0	$5/3$	$-1/3$	1	$-1/3$	0	2	$6/5$	$Y/3$

$$0 = 8AM - 5AM - AM - PX + SX + 5X^2 + 5X^3 + 1X - J$$

$Z_1 =$	Z'	0	0	0	0	$12/5$	-11	All Positive
x_1	1	$4/5$	0	$3/5$	0	$3/5$	$1/5$	
x_2	0	1	$-7/5$	0	$6/5$	$6/5$	$1/5$	
s_3	0	0	2	1	0	0	0	

$$(M-1+) + 3x(MP-S-) + 3x(MZ-S-) + 1x(MN-1-) + J$$

$$\text{MIN } Z = -Z'$$

$$\text{MIN } Z = -(-\frac{12}{5})$$

$$\rightarrow \text{MIN } Z = \frac{12}{5}$$

$$x_1 = 3 \frac{1}{5}$$

$$x_2 = 6 \frac{1}{5}$$

$$Y \cdot \frac{7102}{9102} - X = 40$$

Date _____
Page _____

⑥

$$\text{MAX, } Z = x_1 + 2x_2 + 3x_3 - x_4$$

$$\text{SUB, } x_1 + 2x_2 + 3x_3 = 15$$

$$2x_1 + x_2 + 5x_3 = 20$$

$$x_1 + 2x_2 + x_3 + x_4 = 10$$

$$\text{WHERE, } x_1, x_2, x_3, x_4 \geq 0$$

$$Y \cdot (15) - X \leq 0$$

$$Y \cdot (20) - X \leq 0$$

$$Y \cdot (10) - X \leq 0$$

$$Y \cdot 811 - X \leq 0$$

$$Y \cdot 811 - X \leq 0$$

$$x_1 + 2x_2 + 3x_3 + MA_1 = 15$$

$$2x_1 + x_2 + 5x_3 + MA_2 = 20$$

$$x_1 + 2x_2 + x_3 + x_4 + MA_3 = 10$$

$$Z - x_1 - 2x_2 - 3x_3 + x_4 - MA_1 - MA_2 - MA_3 = 0$$

$$MA_1 + Mx_1 + 2Mx_2 + 3Mx_3 - MA_1 = 15M$$

$$-2Mx_1 + Mx_2 + 5Mx_3 - MA_2 = 20M$$

$$-Mx_1 + 2Mx_2 + Mx_3 + Mx_4 - MA_3 = 10M$$

$$Z + (-1-4M)x_1 + (-2-5M)x_2 + (-3-9M)x_3 + (+1-M)x_4 = -45M$$

$$(1) - = 15 - 45M$$

$$(2) - = 20 - 45M$$

$$15 - 45M = 20 - 45M$$

$$15 = 20$$

X - self circle . Y

Date _____
Page _____

PIRA.	V.	x_1	x_2	x_3	x_4	A_1	A_2	A_3	$\frac{I}{E}$	$\frac{Q}{E}$	FORMULA

0	Z	-1-4M-2-5M-3-9M	1-M	0	0	0	0	0	0	-45M	
	A_1	1	2	3	0	0	0	0	15	5	$x - 3/5 y$
	A_2	2	1	5	0	0	0	0	20	4	$y/5$
	A_3	1	2	1	10	0	0	0	10	10	$x - 1/5 y$

1	Z	20	7-16M	5	0	1-M	0	0	0	12-9M	
	A_1	-1/5	7/5	0	0	0	1	0	3+15/7	Y. 5/7	
	x_3	2/5	1/5	12	0	0	0	0	4	20	
	A_3	3/5	9/5	0	1	0	0	1	6	10/3	

2	Z	-4/7M	0	0	1-M	0	0	0	0	15-15/7 M	
	x_2	-1/7	1/2	0	0	0	0	0	0	15/7	
	x_3	3/7	0	1	0	0	0	0	0	25/7	
	A_3	6/7	0	0	0	1	0	1	15/7	15/7	Y. 1

3	Z	-6/7	0	0	0	0	0	0	0	0/7	-
	x_2	-1/7	1	0	0	0	0	0	0	15/7	-
	x_3	3/7	0	1	0	0	0	0	0	25/7	25/3
	x_4	6/7	0	0	1	0	0	0	0	15/7	5/2

4	Z	0	0	0	1	0	0	0	0	0	ALL POSITIVE
	x_2	0	1	0	0	1/6	0	0	0	5/2	
	x_3	0	0	1	0	-1/2	0	0	0	5/2	
	x_4	1	0	0	0	0	7/6	0	0	5/2	

$$\rightarrow \underset{\text{max}}{Z} = 15, x_1 = x_2 = x_3 = \frac{5}{2}, x_4 = 0$$