

FEASIBLE STARTING SOLUTION (CONTD.)

STANDARD FORM:

$$\text{MIN } Z = 4x_1 + x_2$$

SUBJ. TO

$$3x_1 + x_2 = 3$$

$$4x_1 + 3x_2 - s_2 = 6$$

$$x_1 + 2x_2 + s_3 = 4$$

$$x_1, x_2, s_2, s_3 \geq 0$$

THE M-TECHNIQUE

- INTRODUCE ARTIFICIAL VARIABLES IN ALL EQUATIONS WHICH DO NOT HAVE A SLACK
- THESE VARIABLES ARE ADDED TO THE Z EQUATION WITH LARGE POSITIVE COEFFICIENTS (+M) IN CASE OF MINIMIZATION AND WITH LARGE NEGATIVE COEF. (-M) IN CASE OF MAXIMIZATION.
- THE Z EQUATION IS RE-WRITTEN TO CREATE 0 COEF. FOR ALL VARIABLES WHICH ARE IN THE BASIC SET.

THE EXAMPLE AGAIN:

$$\text{MIN } Z = 4x_1 + x_2 + MR_1 + MR_2$$

S.T.

$$3x_1 + x_2 + R_1 = 3$$

$$4x_1 + 3x_2 - s_2 + R_2 = 6$$

$$x_1 + 2x_2 + s_3 = 4$$

$$x_1, x_2, s_2, s_3, R_1, R_2 \geq 0$$

NOTE: R_1 AND R_2 NEEDS TO BE REPLACED IN Z

$$R_1 = 3 - 3x_1 - x_2$$

$$R_2 = 6 - 4x_1 - 3x_2 + s_2$$

$$\begin{aligned} Z &= 4x_1 + x_2 + 3M - 3Mx_1 - Mx_2 + 6M \\ &\quad - 4Mx_1 - 3Mx_2 + Ms_2 \\ &= (4-7M)x_1 + (1-4M)x_2 + Ms_2 + 9M \end{aligned}$$

THE PROBLEM AGAIN:

$$\text{MIN } Z = (4-7M)x_1 + (1-4M)x_2 + Ms_2 + 9M$$

S.T.

THE CONSTRAINTS IN BLUE