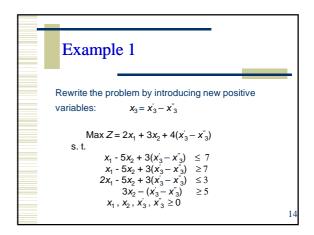
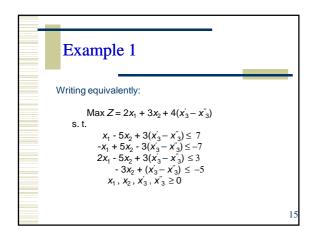
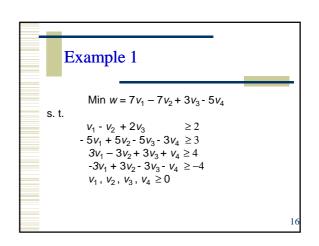
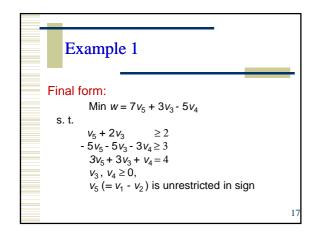


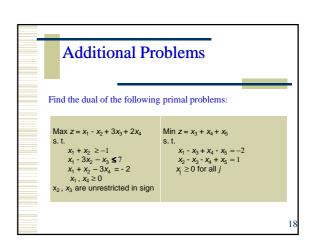
Example 1 Formulate the dual of the LPP: $Max Z = 2x_1 + 3x_2 + 4x_3$ s. t. $x_1 - 5x_2 + 3x_3 = 7$ $2x_1 - 5x_2 + 3x_3 \le 3$ $3x_2 - x_3 \ge 5$ $x_1, x_2 \ge 0$ and x_3 is unrestricted in sign.











Duality & Simplex Method

Rule 1

If the primal (dual) variable be related to a slack and/or surplus variable in the dual (primal) problem, its optimum solution is directly read off from the net evaluation row of the optimum dual (primal) simplex table, as the net evaluation corresponding to this slack and/or surplus variable.

Continued...

Rule 2

If the primal (dual) variable be related to an artificial starting variable in the dual (primal) problem, its optimum value is directly read off from the net evaluation row of the optimum dual (primal) simplex table as the net evaluation relating to this artificial variable after deleting the penalty cost M and changing sign of the net evaluations.

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Continued...

Rule 3

If either problem (primal or dual) has unbounded solution then the other will have no feasible solution.

Duality: Example 1

Write the dual of the following LPP & hence solve it:

$$\text{Max } Z = 3x_1 - 2x_2$$

$$x_1 \leq 4$$

$$x_1 + x_2 \le 5$$

- $x_2 \le -1$

$$x_1, x_2 \ge 0$$

2

Continued...

The dual

Min
$$w = 4v_1 + 6v_2 + 5v_3 - v_4$$

$$v_1 + v_3 \ge 3$$

$$v_2 + v_3 - v_4 \ge -2$$

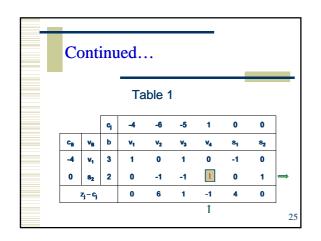
$$v_1^-, v_2^-, v_3^-, v_4 \ge 0$$

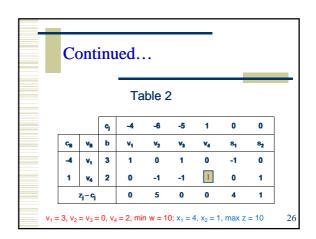
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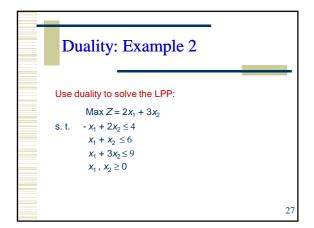
The standard form

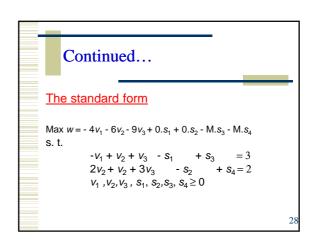
Max $w' = -4v_1 - 6v_2 - 5v_3 + v_4 + 0.s_1 + 0.s_2$

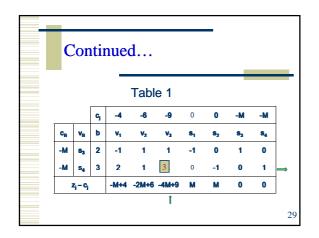
24

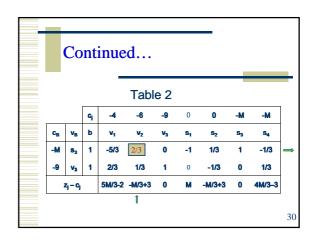












	Co	ont	inue	d	•				
				Tab	ole 3				
		c _j	-4	-6	-9	0	0	-M	-M
CB	V _B	b	V ₁	V ₂	V ₃	S ₁	S ₂	83	S ₄
- 6	V ₂	3/2	-5/2	1	0	-3/2	1/2	3/2	-1/2
-9	V ₃	1/2	3/2	0	1	1/2	-1/2	-1/2	1/2
z _i -c _i 1			11/2	0	0	9/2	3/2	M-9/2	M-3/2