Instituto Tecnológico de Costa Rica

Knapsack Problem

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Problem

Maximize

$$Z = 4x_1 + 5x_2 + 2x_3$$

Subject to

$$2x_1 + 3x_2 + x_3 \leq 10$$
$$0 \leq x_1$$
$$0 \leq x_2$$
$$0 \leq x_3$$

Data Table

	A	B	C
0	$0/x_0 = 0$	$0/x_1 = 0$	$0/x_2 = 0$
1	$0/x_0 = 0$	$0/x_1 = 0$	$2/x_2 = 1$
2	$4/x_0 = 1$	$4/x_1 = 0$	$4/x_2 = 2 - 0$
3	$4/x_0 = 1$	$5/x_1 = 1$	$6/x_2 = 3$
4	$8/x_0 = 2$	$8/x_1 = 0$	$8/x_2 = 4 - 0$
5	$8/x_0 = 2$	$9/x_1 = 1$	$10/x_2 = 5$
6	$12/x_0 = 3$	$12/x_1 = 0$	$12/x_2 = 6 - 0$
7	$12/x_0 = 3$	$13/x_1 = 1$	$14/x_2 = 7$
8	$16/x_0 = 4$	$16/x_1 = 0$	$16/x_2 = 8 - 0$
9	$16/x_0 = 4$	$17/x_1 = 1$	$18/x_2 = 9$
10	$20/x_0 = 5$	$20/x_1 = 0$	$20/x_2 = 10 - 0$

Optimal Solution

Z = 20
$x_3 = 0$
$x_2 = 0$
$x_1 = 5$

Optimal Solution

Z = 20
$x_3 = 10$
$x_2 = 0$
$x_1 = 0$