



1-Work through the simplex method, step by step to solve the following problem.

Maximize $Z = x_1 + 2x_2 + 4x_3$,
subject to

$$3x_1 + x_2 + 5x_3 \leq 10$$

$$x_1 + 4x_2 + x_3 \leq 8$$

$$2x_1 + 2x_3 \leq 7$$

Answer:

Iteration 1							Solution
Basic	x1	x2	x3	sx4	sx5	sx6	
z (max)	-1.00	-2.00	-4.00	0.00	0.00	0.00	0.00
sx4	3.00	1.00	5.00	1.00	0.00	0.00	10.00
sx5	1.00	4.00	1.00	0.00	1.00	0.00	8.00
sx6	2.00	0.00	2.00	0.00	0.00	1.00	7.00

Iteration 2							Solution
Basic	x1	x2	x3	sx4	sx5	sx6	
z (max)	1.40	-1.20	0.00	0.80	0.00	0.00	8.00
x3	0.60	0.20	1.00	0.20	0.00	0.00	2.00
sx5	0.40	3.80	0.00	-0.20	1.00	0.00	6.00
sx6	0.80	-0.40	0.00	-0.40	0.00	1.00	3.00

Iteration 3							Solution
Basic	x1	x2	x3	sx4	sx5	sx6	
z (max)	1.53	0.00	0.00	0.74	0.32	0.00	9.89
x3	0.58	0.00	1.00	0.21	-0.05	0.00	1.68
x2	0.11	1.00	0.00	-0.05	0.26	0.00	1.58
sx6	0.84	0.00	0.00	-0.42	0.11	1.00	3.63

2-

Consider the following set of constraints:

$$x_1 + 2x_2 + 2x_3 + 4x_4 \leq 40$$

$$2x_1 - x_2 + x_3 + 2x_4 \leq 8$$

$$4x_1 - 2x_2 + x_3 - x_4 \leq 10$$

$$x_1, x_2, x_3, x_4 \geq 0$$

Solve the problem for each of the following objective functions.

(a) Maximize $z = 2x_1 + x_2 - 3x_3 + 5x_4$.

(b) Maximize $z = 8x_1 + 6x_2 + 3x_3 - 2x_4$.

(c) Maximize $z = 3x_1 - x_2 + 3x_3 + 4x_4$.

(d) Minimize $z = 5x_1 - 4x_2 + 6x_3 - 8x_4$.