Problem:

Maximize $z = 2x_1 + x_2 + x_3$
subject to

$$\begin{aligned} 3x_1 + x_2 + 3x_3 &= 9 \\ 3x_1 - x_2 &= 3 \end{aligned}$$

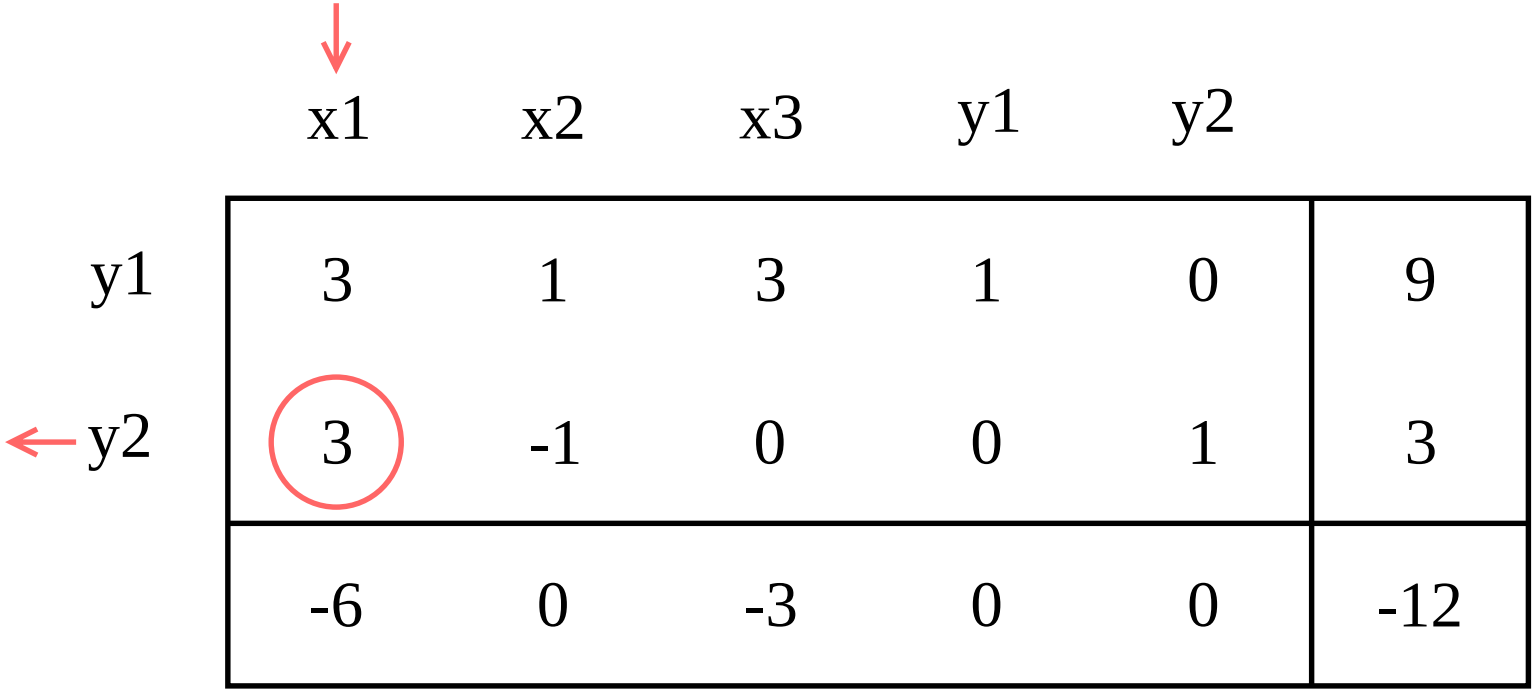
Solve with two-phase algorithm.

	x1	x2	x3	y1	y2	
y1	3	1	3	1	0	9
y2	3	-1	0	0	1	3
	0	0	0	1	1	0

	x1	x2	x3	y1	y2	
y1	3	1	3	1	0	9
y2	3	-1	0	0	1	3
	0	0	0	1	1	0

	x1	x2	x3	y1	y2	
y1	3	1	3	1	0	9
y2	3	-1	0	0	1	3
	-6	0	-3	0	0	-12

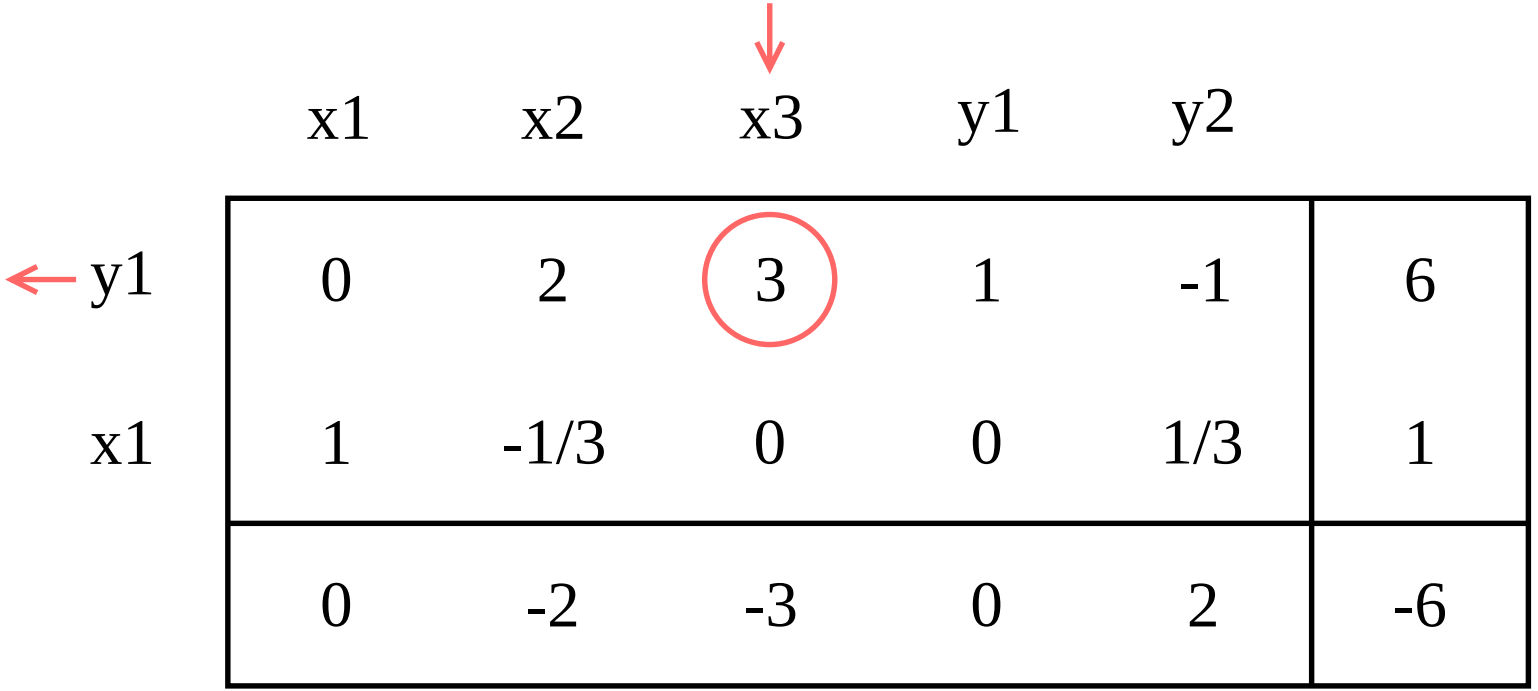
	x1	x2	x3	y1	y2	
y1	3	1	3	1	0	9
y2	3	-1	0	0	1	3
	-6	0	-3	0	0	-12

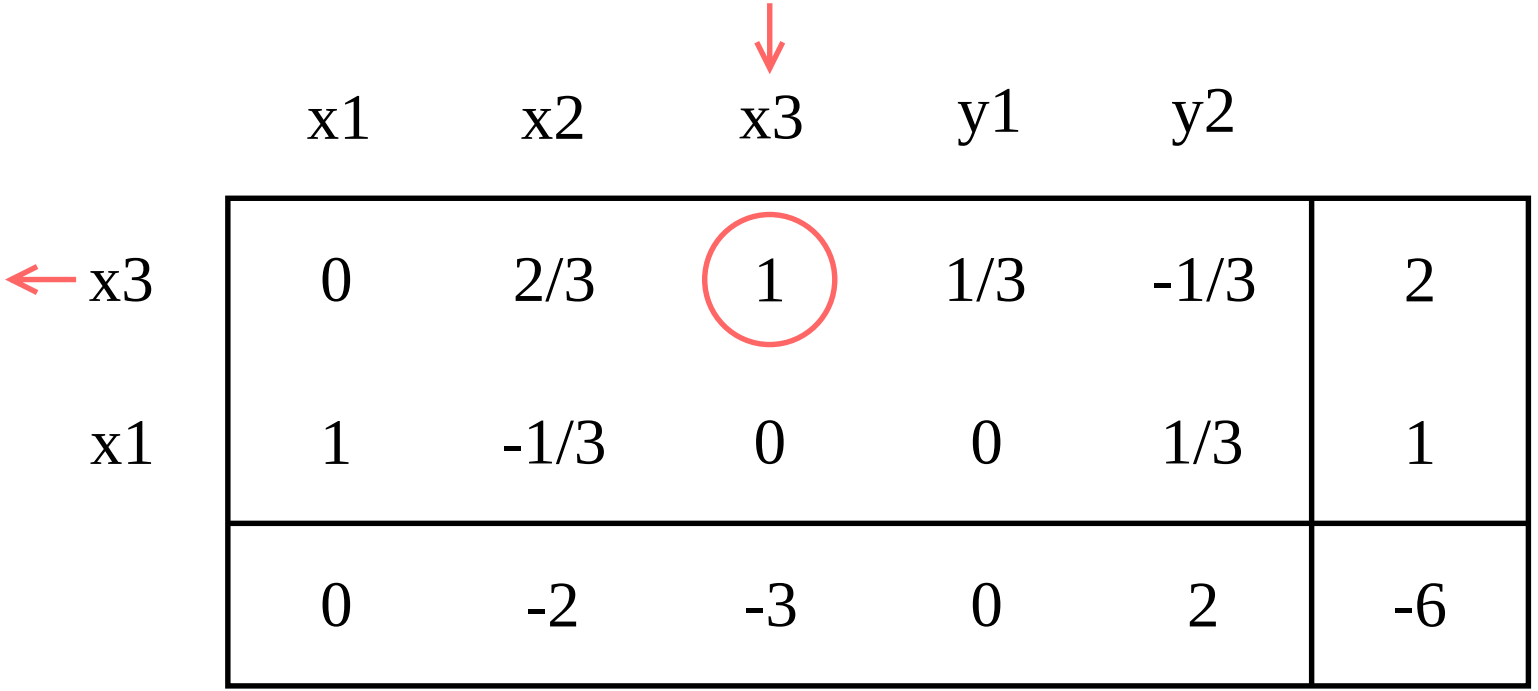

x1
x2
x3
y1
y2
y1
3
1
3
1
0
9
y2
3
-1
0
0
1
3
-6
0
-3
0
0
-12

	x1	x2	x3	y1	y2	
y1	3	1	3	1	0	9
	1	-1/3	0	0	1/3	1
	-6	0	-3	0	0	-12

	x1	x2	x3	y1	y2	
y1	0	2	3	1	-1	6
x1	1	-1/3	0	0	1/3	1
	0	-2	-3	0	2	-6

	x1	x2	x3	y1	y2	
y1	0	2	3	1	-1	6
x1	1	-1/3	0	0	1/3	1
	0	-2	-3	0	2	-6


x1
x2
x3
y1
y2
y1
0
2
3
1
-1
6
x1
1
-1/3
0
0
1/3
1
0
-2
-3
0
2
-6


x1
x2
x3
y1
y2
x3
0
2/3
1
1/3
-1/3
2
x1
1
-1/3
0
0
1/3
1
0
-2
-3
0
2
-6

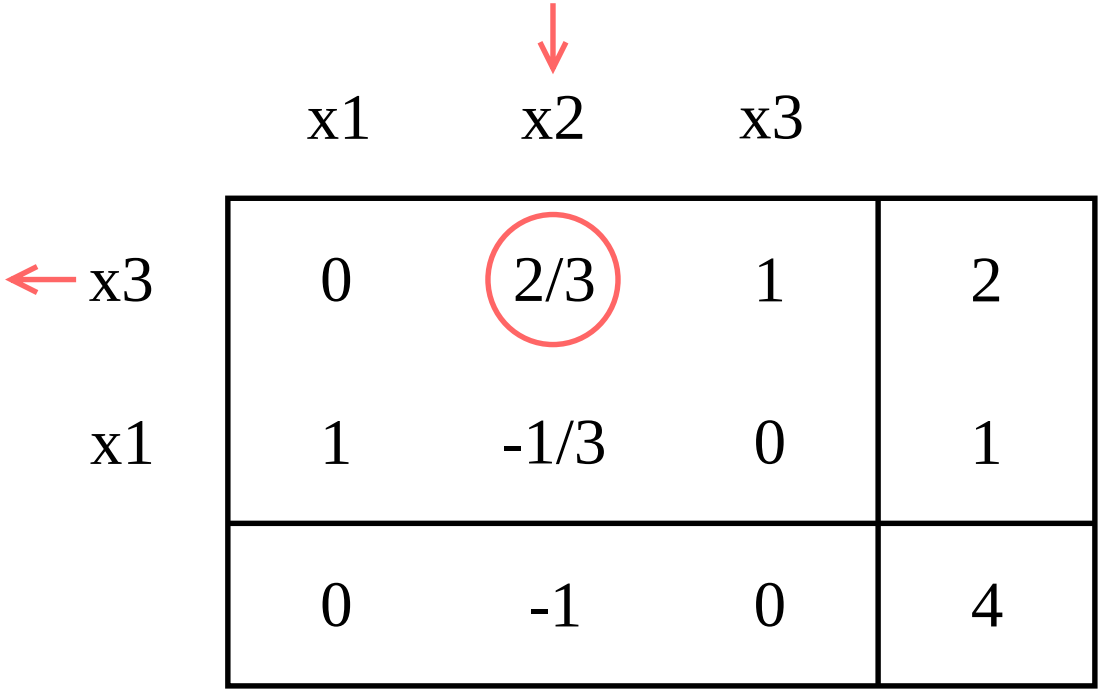
	x1	x2	x3	y1	y2	
x3	0	2/3	1	1/3	-1/3	2
x1	1	-1/3	0	0	1/3	1
	0	0	0	1	1	0

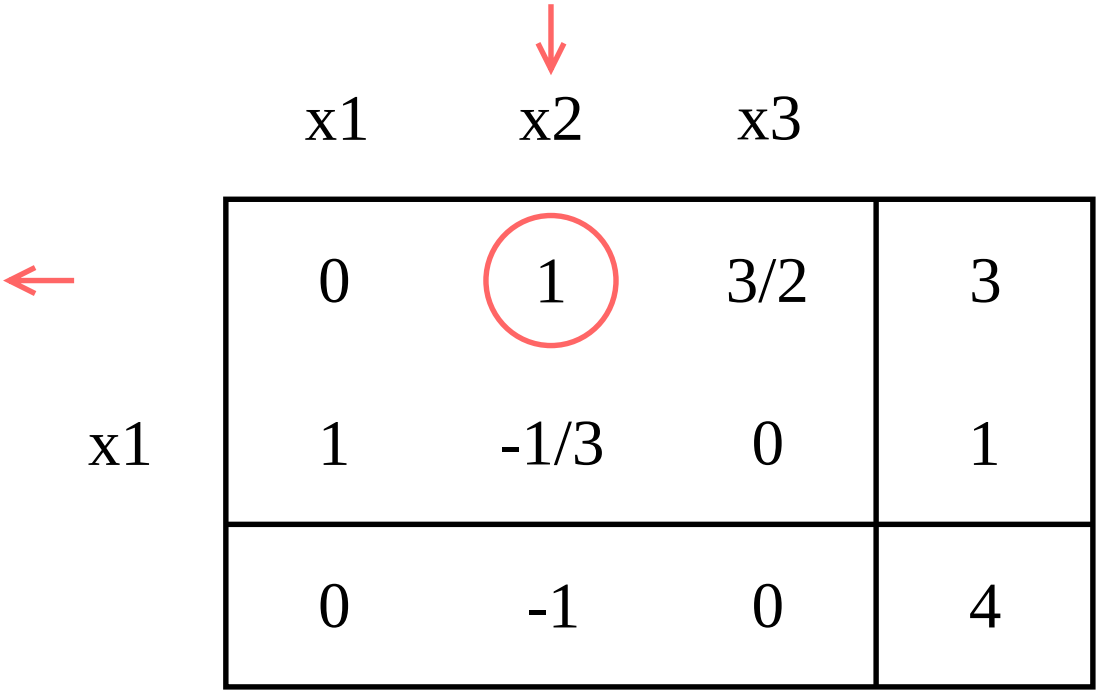
	x1	x2	x3	
x3	0	2/3	1	2
x1	1	-1/3	0	1
	-2	-1	-1	0

	x1	x2	x3	
x3	0	2/3	1	2
x1	1	-1/3	0	1
	-2	-1	-1	0

	x1	x2	x3	
x3	0	2/3	1	2
x1	1	-1/3	0	1
	0	-1	0	4

	x1	x2	x3	
x3	0	2/3	1	2
x1	1	-1/3	0	1
	0	-1	0	4


x1
x2
x3
x3
0
2/3
1
2
x1
1
-1/3
0
1
0
-1
0
4


x1
x2
x3
0
1
3/2
3
x1
1
-1/3
0
1
0
-1
0
4

	x1	x2	x3	
x2	0	1	3/2	3
x1	1	0	1/2	2
	0	0	3/2	7