Integer Problem:

Maximize $z = 3x_1 + 2x_2$
subject to

$$\begin{aligned} 2x_1 + x_2 &\leq 12 \\ x_1 + 3x_2 &\leq 15 \end{aligned}$$

$(x_1, x_2) \geq 0$ in $\mathbb{Z}^2$

Canonical Form:

Maximize $z = 3x_1 + 2x_2$
subject to

$$\begin{aligned}
2x_1 + x_2 + u_1 &= 12 \\
x_1 + 3x_2 + u_2 &= 15
\end{aligned}$$

$(x_1, x_2, u_1, u_2) \geq 0$ in $\mathbb{Z}^4$

	x_1	x_2	u_1	u_2	
u_1	2	1	1	0	12
u_2	1	3	0	1	15
	-3	-2	0	0	0

	x_1	x_2	u_1	u_2	
u_1	2	1	1	0	12
u_2	1	3	0	1	15
	-3	-2	0	0	0

	x_1	x_2	u_1	u_2	
u_1	2	1	1	0	12
u_2	1	3	0	1	15
	-3	-2	0	0	0

	x_1	x_2	u_1	u_2	
←	1	1/2	1/2	0	6
u_2	1	3	0	1	15
	-3	-2	0	0	0

	x_1	x_2	u_1	u_2	
x_1	1	1/2	1/2	0	6
u_2	0	5/2	-1/2	1	9
	0	-1/2	3/2	0	18

	x_1	x_2	u_1	u_2	
x_1	1	1/2	1/2	0	6
u_2	0	5/2	-1/2	1	9
	0	-1/2	3/2	0	18

	x_1	x_2	u_1	u_2	
x_1	1	1/2	1/2	0	6
u_2	0	5/2	-1/2	1	9
	0	-1/2	3/2	0	18

	x_1	x_2	u_1	u_2	
x_1	1	1/2	1/2	0	6
←	0	1	-1/5	2/5	18/5
	0	-1/2	3/2	0	18

	x_1	x_2	u_1	u_2	
x_1	1	0	3/5	-1/5	21/5
x_2	0	1	-1/5	2/5	18/5
	0	0	7/5	1/5	99/5

	x_1	x_2	u_1	u_2	
x_1	1	0	3/5	-1/5	21/5
x_2	0	1	-1/5	2/5	18/5
	0	0	7/5	1/5	99/5

$$x_2 - \frac{1}{5}u_1 + \frac{2}{5}u_2 \ = \ \frac{18}{5} \quad \text{and} \quad (x_1, x_2, u_1, u_2) \geq 0 \text{ in } \mathbb{Z}^4$$

$$x_2 + \lfloor -\frac{1}{5} \rfloor u_1 + \lfloor \frac{2}{5} \rfloor u_2 \ \leq \ \lfloor \frac{18}{5} \rfloor$$

$$x_2 - u_1 \ \leq \ 3$$

	x_1	x_2	u_1	u_2	u_3	
x_1	1	0	3/5	-1/5	0	21/5
x_2	0	1	-1/5	2/5	0	18/5
u_3	0	1	-1	0	1	3
	0	0	7/5	1/5	0	99/5

	x_1	x_2	u_1	u_2	u_3	
x_1	1	0	3/5	-1/5	0	21/5
x_2	0	1	-1/5	2/5	0	18/5
u_3	0	1	-1	0	1	3
	0	0	7/5	1/5	0	99/5

	x_1	x_2	u_1	u_2	u_3	
x_1	1	0	3/5	-1/5	0	21/5
x_2	0	1	-1/5	2/5	0	18/5
u_3	0	0	-4/5	-2/5	1	-3/5
	0	0	7/5	1/5	0	99/5

	x_1	x_2	u_1	u_2	u_3	
x_1	1	0	3/5	-1/5	0	21/5
x_2	0	1	-1/5	2/5	0	18/5
← u_3	0	0	-4/5	-2/5	1	-3/5
	0	0	7/5	1/5	0	99/5

	x_1	x_2	u_1	u_2 ↓	u_3	
x_1	1	0	3/5	-1/5	0	21/5
x_2	0	1	-1/5	2/5	0	18/5
← u_3	0	0	-4/5	-2/5	1	-3/5
	0	0	7/5	1/5	0	99/5

	x_1	x_2	u_1	u_2 ↓	u_3	
x_1	1	0	3/5	-1/5	0	21/5
x_2	0	1	-1/5	2/5	0	18/5
←	0	0	2	(1)	-5/2	3/2
	0	0	7/5	1/5	0	99/5

	x_1	x_2	u_1	u_2	u_3	
x_1	1	0	1	0	-1/2	9/2
x_2	0	1	-1	0	1	3
u_2	0	0	2	1	-5/2	3/2
	0	0	1	0	1/2	39/2

	x_1	x_2	u_1	u_2	u_3	
x_1	1	0	1	0	-1/2	9/2
x_2	0	1	-1	0	1	3
u_2	0	0	2	1	-5/2	3/2
	0	0	1	0	1/2	39/2

$$x_1 + u_1 - \frac{1}{2}u_3 = \frac{9}{2} \quad \text{and} \quad (x_1, x_2, u_1, u_2, u_3) \geq 0 \text{ in } \mathbb{Z}^5$$

$$x_1 + u_1 - u_3 \leq 4$$

	x_1	x_2	u_1	u_2	u_3	u_4	
x_1	1	0	1	0	-1/2	0	9/2
x_2	0	1	-1	0	1	0	3
u_2	0	0	2	1	-5/2	0	3/2
u_4	1	0	1	0	-1	1	4
	0	0	1	0	1/2	0	39/2

	x_1	x_2	u_1	u_2	u_3	u_4	
x_1	1	0	1	0	-1/2	0	9/2
x_2	0	1	-1	0	1	0	3
u_2	0	0	2	1	-5/2	0	3/2
u_4	1	0	1	0	-1	1	4
	0	0	1	0	1/2	0	39/2

	x_1	x_2	u_1	u_2	u_3	u_4	
x_1	1	0	1	0	-1/2	0	9/2
x_2	0	1	-1	0	1	0	3
u_2	0	0	2	1	-5/2	0	3/2
u_4	0	0	0	0	-1/2	1	-1/2
	0	0	1	0	1/2	0	39/2

	x_1	x_2	u_1	u_2	u_3	u_4	
x_1	1	0	1	0	-1/2	0	9/2
x_2	0	1	-1	0	1	0	3
u_2	0	0	2	1	-5/2	0	3/2
← u_4	0	0	0	0	-1/2	1	-1/2
	0	0	1	0	1/2	0	39/2

	x_1	x_2	u_1	u_2	u_3 ↓	u_4	
x_1	1	0	1	0	-1/2	0	9/2
x_2	0	1	-1	0	1	0	3
u_2	0	0	2	1	-5/2	0	3/2
← u_4	0	0	0	0	(-1/2)	1	-1/2
	0	0	1	0	1/2	0	39/2

	x_1	x_2	u_1	u_2	u_3	u_4	
x_1	1	0	1	0	-1/2	0	9/2
x_2	0	1	-1	0	1	0	3
u_2	0	0	2	1	-5/2	0	3/2
←	0	0	0	0	1	-2	1
	0	0	1	0	1/2	0	39/2

	x_1	x_2	u_1	u_2	u_3	u_4	
x_1	1	0	1	0	0	-1	5
x_2	0	1	-1	0	0	2	2
u_2	0	0	2	1	0	-5	4
u_3	0	0	0	0	1	-2	1
	0	0	1	0	0	1	19

	x_1	x_2	u_1	u_2	u_3	u_4	
x_1	1	0	1	0	0	-1	5
x_2	0	1	-1	0	0	2	2
u_2	0	0	2	1	0	-5	4
u_3	0	0	0	0	1	-2	1
	0	0	1	0	0	1	19

Optimal solution: $(x_1, x_2) = (5, 2)$