Integer Problem:

Maximize $z = 5x_1 + 6x_2$
subject to

$$\begin{aligned} 10x_1 + 3x_2 &\leq 52 \\ 2x_1 + 3x_2 &\leq 18 \end{aligned}$$

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

Canonical Form:

Maximize $z = 5x_1 + 6x_2$
subject to

$$\begin{array}{rcl} 10x_1 + 3x_2 + u_1 \qquad & = & 52 \\ 2x_1 + 3x_2 \qquad + u_2 & = & 18 \end{array}$$

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

	x_1	x_2	u_1	u_2	
u_1	10	3	1	0	52
u_2	2	3	0	1	18
	-5	-6	0	0	0

	x_1	x_2	u_1	u_2	
u_1	10	3	1	0	52
u_2	2	3	0	1	18
	-5	-6	0	0	0

	x_1	x_2	u_1	u_2	
u_1	10	3	1	0	52
u_2	2	3	0	1	18
	-5	-6	0	0	0

	x_1	x_2	u_1	u_2	
←	1	3/10	1/10	0	26/5
u_2	2	3	0	1	18
	-5	-6	0	0	0

	x_1	x_2	u_1	u_2	
x_1	1	3/10	1/10	0	26/5
u_2	0	12/5	-1/5	1	38/5
	0	-9/2	1/2	0	26

	x_1	x_2	u_1	u_2	
x_1	1	3/10	1/10	0	26/5
u_2	0	12/5	-1/5	1	38/5
	0	-9/2	1/2	0	26

	x_1	x_2	u_1	u_2	
x_1	1	3/10	1/10	0	26/5
← u_2	0	12/5	-1/5	1	38/5
	0	-9/2	1/2	0	26

	x_1	x_2	u_1	u_2	
x_1	1	3/10	1/10	0	26/5
←	0	1	-1/12	5/12	19/6
	0	-9/2	1/2	0	26

	x_1	x_2	u_1	u_2	
x_1	1	0	1/8	-1/8	17/4
x_2	0	1	-1/12	5/12	19/6
	0	0	1/8	15/8	161/4

	x_1	x_2	u_1	u_2	
x_1	1	0	1/8	-1/8	17/4
x_2	0	1	-1/12	5/12	19/6
	0	0	1/8	15/8	161/4

$$x_1 + \frac{1}{8}u_1 - \frac{1}{8}u_2 \;=\; \frac{17}{4} \quad \text{and} \quad (x_1, x_2, u_1, u_2) \geq 0 \text{ in } \mathbb{Z}^4$$

$$x_1 + \lfloor \tfrac{1}{8} \rfloor u_1 + \lfloor -\tfrac{1}{8} \rfloor u_2 \;\leq\; \lfloor \tfrac{17}{4} \rfloor$$

$$x_1 - u_2 \;\leq\; 4$$

	x_1	x_2	u_1	u_2	u_3	
x_1	1	0	1/8	-1/8	0	17/4
x_2	0	1	-1/12	5/12	0	19/6
u_3	1	0	0	-1	1	4
	0	0	1/8	15/8	0	161/4

	x_1	x_2	u_1	u_2	u_3	
x_1	1	0	1/8	-1/8	0	17/4
x_2	0	1	-1/12	5/12	0	19/6
u_3	1	0	0	-1	1	4
	0	0	1/8	15/8	0	161/4

	x_1	x_2	u_1	u_2	u_3	
x_1	1	0	1/8	-1/8	0	17/4
x_2	0	1	-1/12	5/12	0	19/6
u_3	0	0	-1/8	-7/8	1	-1/4
	0	0	1/8	15/8	0	161/4

	x_1	x_2	u_1	u_2	u_3	
x_1	1	0	1/8	-1/8	0	17/4
x_2	0	1	-1/12	5/12	0	19/6
← u_3	0	0	-1/8	-7/8	1	-1/4
	0	0	1/8	15/8	0	161/4

	x_1	x_2	u_1 ↓	u_2	u_3	
x_1	1	0	1/8	-1/8	0	17/4
x_2	0	1	-1/12	5/12	0	19/6
← u_3	0	0	-1/8	-7/8	1	-1/4
	0	0	1/8	15/8	0	161/4

	x_1	x_2	u_1	u_2	u_3	
x_1	1	0	1/8	-1/8	0	17/4
x_2	0	1	-1/12	5/12	0	19/6
←	0	0	1	7	-8	2
	0	0	1/8	15/8	0	161/4

	x_1	x_2	u_1	u_2	u_3	
x_1	1	0	0	-1	1	4
x_2	0	1	0	1	-2/3	10/3
u_1	0	0	1	7	-8	2
	0	0	0	1	1	40

	x_1	x_2	u_1	u_2	u_3	
x_1	1	0	0	-1	1	4
x_2	0	1	0	1	-2/3	10/3
u_1	0	0	1	7	-8	2
	0	0	0	1	1	40

$$x_2 + u_2 - \tfrac{2}{3}u_3 \ = \ \tfrac{10}{3} \quad \text{and} \quad (x_1, x_2, u_1, u_2, u_3) \geq 0 \text{ in } \mathbb{Z}^5$$

$$x_2 + u_2 - u_3 \ \leq \ 3$$

	x_1	x_2	u_1	u_2	u_3	u_4	
x_1	1	0	0	-1	1	0	4
x_2	0	1	0	1	-2/3	0	10/3
u_1	0	0	1	7	-8	0	2
u_4	0	1	0	1	-1	1	3
	0	0	0	1	1	0	40

	x_1	x_2	u_1	u_2	u_3	u_4	
x_1	1	0	0	-1	1	0	4
x_2	0	1	0	1	-2/3	0	10/3
u_1	0	0	1	7	-8	0	2
u_4	0	1	0	1	-1	1	3
	0	0	0	1	1	0	40

	x_1	x_2	u_1	u_2	u_3	u_4	
x_1	1	0	0	-1	1	0	4
x_2	0	1	0	1	-2/3	0	10/3
u_1	0	0	1	7	-8	0	2
u_4	0	0	0	0	-1/3	1	-1/3
	0	0	0	1	1	0	40

	x_1	x_2	u_1	u_2	u_3	u_4	
x_1	1	0	0	-1	1	0	4
x_2	0	1	0	1	-2/3	0	10/3
u_1	0	0	1	7	-8	0	2
← u_4	0	0	0	0	-1/3	1	-1/3
	0	0	0	1	1	0	40

	x_1	x_2	u_1	u_2	u_3 ↓	u_4	
x_1	1	0	0	-1	1	0	4
x_2	0	1	0	1	-2/3	0	10/3
u_1	0	0	1	7	-8	0	2
← u_4	0	0	0	0	(-1/3)	1	-1/3
	0	0	0	1	1	0	40

	x_1	x_2	u_1	u_2	u_3	u_4	
x_1	1	0	0	-1	1	0	4
x_2	0	1	0	1	-2/3	0	10/3
u_1	0	0	1	7	-8	0	2
←	0	0	0	0	1	-3	1
	0	0	0	1	1	0	40

	x_1	x_2	u_1	u_2	u_3	u_4	
x_1	1	0	0	-1	0	3	3
x_2	0	1	0	1	0	-2	4
u_1	0	0	1	7	0	-24	10
u_3	0	0	0	0	1	-3	1
	0	0	0	1	0	3	39

	x_1	x_2	u_1	u_2	u_3	u_4	
x_1	1	0	0	-1	0	3	3
x_2	0	1	0	1	0	-2	4
u_1	0	0	1	7	0	-24	10
u_3	0	0	0	0	1	-3	1
	0	0	0	1	0	3	39

Optimal solution: $(x_1, x_2) = (3, 4)$