Transform to Standard Form:

Objective: total profit: max $z = 200x_1 + 300x_2$

subject to: Stock Levels: $0.5x_1 + 0.3x_2 \le 1000$

$0.2x_1 + 0.25x_2 \le 500$

$0.25x_1 + 0.5x_2 \le 800$

non-negative: $x_1, x_2 \ge 0$

$\Rightarrow$

$$\begin{cases} \text{maximize } z = 200x_1 + 300x_2 \\ \text{subject to } 0.5x_1 + 0.3x_2 + s_1 = 1000 \\ 0.2x_1 + 0.25x_2 + s_2 = 500 \\ 0.25x_1 + 0.5x_2 + s_3 = 800 \\ x_1, x_2, s_1, s_2 \ge 0 \end{cases}$$

Simplex Table

c_j	Basic Variable	200 x_1	300 x_2	0 s_1	0 s_2	0 s_3	0 b_i	b_i/a_{ij}
0	s_1	0.5	0.3	1	0	0	1000	1000/0.3 ≈ 3333.3
0	s_2	0.2	0.25	0	1	0	500	2000
0	s_3	0.25	0.5	0	0	1	800	1600 min
	z_j	0	0					
	$c_j - z_j$	200	300 max					

pivot value

select s_1, s_2, s_3 as basic variables

c_j	Basic Variable	200 x_1	300 x_2	0 s_1	0 s_2	0 s_3	0 b_i	b_i/a_{ij}
0	s_1	7/20	0	1	0	-0.6	520	1458.7
0	s_2	3/40	0	0	1	-0.5	100	1333.3 min
3	x_2	0.5	1	0	0	2	1600	3200
	z_j	150	300	0	0	600		
	$c_j - z_j$	50 max	0	0	0	-600		

Select s_1, s_2, s_3 as basic variables , set 1 to pivot , set 0 to all cells of the other rows of pivot column

Replace s_3 with x_2 as basic variables, set 1 to pivot , set 0 to all cells of the other rows of pivot column

$c_j - z_j \ge 0$, the coefficients of x_1, x_2 are positive => not the optimal solution => repeat above steps

c_j	Basic Variable	200 x_1	300 x_2	0 s_1	0 s_2	0 s_3	0 b_i	b_i/a_{ij}
0	s_1	0	0	1	-14/3	26/15	160/3	
2	x_1	1	0	0	40/3	-20/3	4000/3	
3	x_2	0	1	0	-10/3	16/3	2800/3	
	z_j	200	300	0	2000/3	800/3	$\frac{1640000}{3} = 546666.7$	
	$c_j - z_j$	0	0	0	$\frac{-2000}{3}$	-800/3		

≤ 0

Replace s_2 with x_1 as basic variables, set 1 to pivot , set 0 to all cells of the other rows of pivot column

all $c_j - z_j \le 0$ => find the optimal solution

The optimal solution : $(z, x_1, x_2, s_1, s_2, s_3) = (\frac{1640000}{3}, \frac{4000}{3}, \frac{2800}{3}, \frac{160}{3}, 0, 0)$

$z = \frac{1640000}{3} - \frac{2000}{3}s_2 - \frac{800}{3}s_3$

The optimal value $z = \frac{1640000}{3} \approx 546666.7$

The shadow price of material2 is $\frac{2000}{3}$ ¥/g, and the shadow price of material3 is $\frac{800}{3}$ ¥/g, which means 1g material2 is bought, $\frac{2000}{3}$ ¥ optimal value will be increased and 1g material3 is bought, $\frac{800}{3}$ ¥ optimal value will be increased