HW Linear Programming

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1. Solving the following linear program using simplex method

$$\max Z = 3x_1 + 6x_2 + 2x_3$$

$$\begin{cases} 3x_1 + 4x_2 + x_3 \le 2 \\ x_1 + 3x_2 + 2x_3 \le 1 \\ x_1 \ge 0, x_2 \ge 0, x_3 \ge 0 \end{cases}$$

augmented form

$$\max \quad z = 3x_1 + 6x_2 + 2x_3$$

$$3x_1 + 4x_2 + x_3 + s_1 = 2$$

$$x_1 + 3x_2 + 2x_3 + s_2 = 1$$

$$s_1, s_2, x_1, x_2, x_3 \ge 0$$

	x_1	x_2	x_3	s_1	s_2	β_i
2	(3)	4	1	1	0	2/3
1	1	3	2	0	1	1
0	3	6	2	0	0	

b	x_1	x_2	x_3	s_1	s_2	β_i
4 2/3	1	4/3	1/3	1/3	0	2/4
1/3	0	(5/3)	5/3	-1/3	1	1/5
-z | -2	0	2	1	-1	0	

b	x_1	x_2	x_3	s_1	s_2	β_i
2/5	1	0	-1	3/5	-4/5	
1/5	0	1	1	-1/5	3/5	
-z | ~~-2~~ -12/5	0	0	-1	-3/5	-6/5	

$$Z = \frac{12}{5} \qquad \left(\frac{2}{5}, \frac{1}{5}, 0\right)$$