4. Maximize, $Z = 6x_1 + x_2 + 4x_3$

subject to

$x_1 \leq 4$

$3x_1 + 7x_2 + x_3 \leq 15$

$x_1 - 2x_2 + 3x_3 \leq 20$

$x_1 \geq 0;\ x_2 \geq 0;\ x_3 \geq 0;$

Solve:

$Z - 6x_1 - x_2 - 4x_3 = 0$ ——— (0)

$3x_1 + 7x_2 + x_3 + x_4 = 15$ ——— (1)

$x_1 - 2x_2 + 3x_3 + x_5 = 20$ ——— (2)

iteration	Basic variable	Eqn	Z	x_1	x_2	x_3	x_4	x_5	Right side	Ratio
0	Z	(0)	1	-6	-1	-4	0	0	0	
	x_4	(1)	0	3	7	1	1	0	15	$\frac{15}{3}=5$ min
	x_5	(2)	0	1	-2	3	0	1	20	$\frac{20}{1}=20$
1	$R_1'=R_1+R_2'\times 6$	Z	(0)	1	0	13	-2	2	0	30	
	$R_2'=R_2\times\frac{1}{3}\rightarrow$	x_1	(1)	0	1	$\frac{7}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	0	5	$5\div\frac{1}{3}=15$
	$R_3'=R_3+R_2'(-1)$	x_5	(2)	0	0	$-\frac{13}{3}$	$\frac{8}{3}$	$-\frac{1}{3}$	1	15	$\frac{15}{8/3}=\frac{45}{8}$ min
2	$R_1''=R_1'+R_3''(2)$	Z	(0)	1	0	$\frac{39}{4}$	0	$\frac{7}{4}$	$\frac{5}{4}$	$\frac{165}{4}$	
	$R_2''=R_2'+R_3''(-\frac{1}{3})$	x_1	(1)	0	1	$\frac{23}{8}$	0	$\frac{3}{8}$	$-\frac{1}{8}$	25/8	
	$R_3''=R_3'\times\frac{3}{8}$	x_3	(2)	0	0	$-\frac{13}{8}$	1	$-\frac{1}{8}$	$\frac{3}{8}$	$\frac{45}{8}$	

So, Maximize, $Z=\frac{165}{4}$

$(x_1, x_2, x_3)=(\frac{25}{8}, 0, \frac{45}{8})$