

Mixed Integer Problem:

Maximize $z = 11x_1 + 80x_2 + 13x_3$

subject to

$$3x_1 + 4x_2 + x_3 \leq 20$$

$$x_1 + 10x_2 + x_3 \leq 22$$

$$x_1 + 8x_2 + 3x_3 \leq 28$$

$$x \geq 0 \text{ in } \mathbb{R}^3 \ ; \ x_1, x_3 \in \mathbb{Z}$$

Canonical Form:

Maximize $z = 11x_1 + 80x_2 + 13x_3$

subject to

$$3x_1 + 4x_2 + x_3 + u_1 = 20$$

$$x_1 + 10x_2 + x_3 + u_2 = 22$$

$$x_1 + 8x_2 + 3x_3 + u_3 = 28$$

$$(x, u) \geq 0 \text{ in } \mathbb{R}^6 ; \quad x_1, x_3 \in \mathbb{Z}$$

	x_1	x_2	x_3	u_1	u_2	u_3	
u_1	3	4	1	1	0	0	20
u_2	1	10	1	0	1	0	22
u_3	1	8	3	0	0	1	28
	-11	-80	-13	0	0	0	0



	x_1	x_2	x_3	u_1	u_2	u_3	
u_1	3	4	1	1	0	0	20
u_2	1	10	1	0	1	0	22
u_3	1	8	3	0	0	1	28
	-11	-80	-13	0	0	0	0



	x_1	x_2	x_3	u_1	u_2	u_3	
u_1	3	4	1	1	0	0	20
u_2	1	10	1	0	1	0	22
u_3	1	8	3	0	0	1	28
	-11	-80	-13	0	0	0	0



	x_1	x_2	x_3	u_1	u_2	u_3	
u_1	3	4	1	1	0	0	20
u_3	1/10	1	1/10	0	1/10	0	11/5
	1	8	3	0	0	1	28
	-11	-80	-13	0	0	0	0

	x_1	x_2	x_3	u_1	u_2	u_3	
u_1	$13/5$	0	$3/5$	1	$-2/5$	0	$56/5$
x_2	$1/10$	1	$1/10$	0	$1/10$	0	$11/5$
u_3	$1/5$	0	$11/5$	0	$-4/5$	1	$52/5$
	-3	0	-5	0	8	0	176



	x_1	x_2	x_3	u_1	u_2	u_3	
u_1	$13/5$	0	$3/5$	1	$-2/5$	0	$56/5$
x_2	$1/10$	1	$1/10$	0	$1/10$	0	$11/5$
u_3	$1/5$	0	$11/5$	0	$-4/5$	1	$52/5$
	-3	0	-5	0	8	0	176



x_1 x_2 x_3 u_1 u_2 u_3

u_1 $13/5$ 0 $3/5$ 1 $-2/5$ 0 $56/5$

x_2 $1/10$ 1 $1/10$ 0 $1/10$ 0 $11/5$

$\leftarrow u_3$ $1/5$ 0 $11/5$ 0 $-4/5$ 1 $52/5$

-3 0 -5 0 8 0 176

	x_1	x_2	x_3	u_1	u_2	u_3	
u_1	$13/5$	0	$3/5$	1	$-2/5$	0	$56/5$
x_2	$1/10$	1	$1/10$	0	$1/10$	0	$11/5$
$\leftarrow u_3$	$1/5$	0	$11/5$	0	$-4/5$	1	$52/5$
	-3	0	-5	0	8	0	176



x_1 x_2 x_3 u_1 u_2 u_3

u_1 13/5 0 3/5 1 -2/5 0 56/5

x_2 1/10 1 1/10 0 1/10 0 11/5



1/11 0 1 0 -4/11 5/11 52/11

-3 0 -5 0 8 0 176

	x_1	x_2	x_3	u_1	u_2	u_3	
u_1	13/5	0	3/5	1	-2/5	0	56/5
x_2	1/10	1	1/10	0	1/10	0	11/5
	1/11	0	1	0	-4/11	5/11	52/11
	-3	0	-5	0	8	0	176

	x_1	x_2	x_3	u_1	u_2	u_3	
u_1	28/11	0	0	1	-2/11	-3/11	92/11
x_2	1/11	1	0	0	3/22	-1/22	19/11
x_3	1/11	0	1	0	-4/11	5/11	52/11
	-28/11	0	0	0	68/11	25/11	2196/11

 x_1 x_2 x_3 u_1 u_2 u_3 u_1

28/11

0

0

1

-2/11

-3/11

92/11

 x_2

1/11

1

0

0

3/22

-1/22

19/11

 x_3

1/11

0

1

0

-4/11

5/11

52/11

-28/11

0

0

0

68/11

25/11

2196/11

 x_1 x_2 x_3 u_1 u_2 u_3 $\leftarrow u_1$ $28/11$

0

0

1

 $-2/11$ $-3/11$ $92/11$ x_2 $1/11$

1

0

0

 $3/22$ $-1/22$ $19/11$ x_3 $1/11$

0

1

0

 $-4/11$ $5/11$ $52/11$ $-28/11$

0

0

0

 $68/11$ $25/11$ $2196/11$

 x_1 x_2 x_3 u_1 u_2 u_3 

1

0

0

11/28

-1/14

-3/28

23/7

 x_2

1/11

1

0

0

3/22

-1/22

19/11

 x_3

1/11

0

1

0

-4/11

5/11

52/11

-28/11

0

0

0

68/11

25/11

2196/11

	x_1	x_2	x_3	u_1	u_2	u_3	
x_1	1	0	0	$11/28$	$-1/14$	$-3/28$	$23/7$
x_2	0	1	0	$-1/28$	$1/7$	$-1/28$	$10/7$
x_3	0	0	1	$-1/28$	$-5/14$	$13/28$	$31/7$
	0	0	0	1	6	2	208

	x_1	x_2	x_3	u_1	u_2	u_3	
x_1	1	0	0	11/28	-1/14	-3/28	23/7
x_2	0	1	0	-1/28	1/7	-1/28	10/7
x_3	0	0	1	-1/28	-5/14	13/28	31/7
	0	0	0	1	6	2	208

Root of tree:

$z = 208$
$x_1 = 23/7 = 3\frac{2}{7}$
$x_2 = 10/7 = 1\frac{3}{7}$
$x_3 = 31/7 = 4\frac{3}{7}$

Branch the leaf:

$z = 208$
$x_1 = 23/7 = 3\frac{2}{7}$
$x_2 = 10/7 = 1\frac{3}{7}$
$x_3 = 31/7 = 4\frac{3}{7}$

New constraints: $x_3 \leq 4$ and $x_3 \geq 5$

	x_1	x_2	x_3	u_1	u_2	u_3	
x_1	1	0	0	11/28	-1/14	-3/28	23/7
x_2	0	1	0	-1/28	1/7	-1/28	10/7
x_3	0	0	1	-1/28	-5/14	13/28	31/7
	0	0	0	1	6	2	208

Add constraint: $x_3 \leq 4$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	11/28	-1/14	-3/28	0	23/7
x_2	0	1	0	-1/28	1/7	-1/28	0	10/7
x_3	0	0	1	-1/28	-5/14	13/28	0	31/7
u_4	0	0	1	0	0	0	1	4
	0	0	0	1	6	2	0	208

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	$11/28$	$-1/14$	$-3/28$	0	$23/7$
x_2	0	1	0	$-1/28$	$1/7$	$-1/28$	0	$10/7$
x_3	0	0	1	$-1/28$	$-5/14$	$13/28$	0	$31/7$
u_4	0	0	1	0	0	0	1	4
	0	0	0	1	6	2	0	208

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	$11/28$	$-1/14$	$-3/28$	0	$23/7$
x_2	0	1	0	$-1/28$	$1/7$	$-1/28$	0	$10/7$
x_3	0	0	1	$-1/28$	$-5/14$	$13/28$	0	$31/7$
u_4	0	0	0	$1/28$	$5/14$	$-13/28$	1	$-3/7$
	0	0	0	1	6	2	0	208

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	11/28	-1/14	-3/28	0	23/7
x_2	0	1	0	-1/28	1/7	-1/28	0	10/7
x_3	0	0	1	-1/28	-5/14	13/28	0	31/7
$\leftarrow u_4$	0	0	0	1/28	5/14	-13/28	1	-3/7
	0	0	0	1	6	2	0	208

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	11/28	-1/14	-3/28	0	23/7
x_2	0	1	0	-1/28	1/7	-1/28	0	10/7
x_3	0	0	1	-1/28	-5/14	13/28	0	31/7
u_4	0	0	0	1/28	5/14	-13/28	1	-3/7
	0	0	0	1	6	2	0	208



x_1 x_2 x_3 u_1 u_2 u_3 u_4

x_1 1 0 0 11/28 -1/14 -3/28 0 23/7

x_2 0 1 0 -1/28 1/7 -1/28 0 10/7

x_3 0 0 1 -1/28 -5/14 13/28 0 31/7



0 0 0 -1/13 -10/13 1 -28/13 12/13

0 0 0 1 6 2 0 208

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	$5/13$	$-2/13$	0	$-3/13$	$44/13$
x_2	0	1	0	$-1/26$	$3/26$	0	$-1/13$	$19/13$
x_3	0	0	1	0	0	0	1	4
u_3	0	0	0	$-1/13$	$-10/13$	1	$-28/13$	$12/13$
	0	0	0	$15/13$	$98/13$	0	$56/13$	$2680/13$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	5/13	-2/13	0	-3/13	44/13
x_2	0	1	0	-1/26	3/26	0	-1/13	19/13
x_3	0	0	1	0	0	0	1	4
u_3	0	0	0	-1/13	-10/13	1	-28/13	12/13
	0	0	0	15/13	98/13	0	56/13	2680/13

Left child:

$z = 2680/13 = 206\frac{2}{13}$
$x_1 = 44/13 = 3\frac{5}{13}$
$x_2 = 19/13 = 1\frac{6}{13}$
$x_3 = 4$

	x_1	x_2	x_3	u_1	u_2	u_3	
x_1	1	0	0	11/28	-1/14	-3/28	23/7
x_2	0	1	0	-1/28	1/7	-1/28	10/7
x_3	0	0	1	-1/28	-5/14	13/28	31/7
	0	0	0	1	6	2	208

Add constraint: $x_3 \geq 5$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	11/28	-1/14	-3/28	0	23/7
x_2	0	1	0	-1/28	1/7	-1/28	0	10/7
x_3	0	0	1	-1/28	-5/14	13/28	0	31/7
u_4	0	0	-1	0	0	0	1	-5
	0	0	0	1	6	2	0	208

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	$11/28$	$-1/14$	$-3/28$	0	$23/7$
x_2	0	1	0	$-1/28$	$1/7$	$-1/28$	0	$10/7$
x_3	0	0	1	$-1/28$	$-5/14$	$13/28$	0	$31/7$
u_4	0	0	-1	0	0	0	1	-5
	0	0	0	1	6	2	0	208

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	$11/28$	$-1/14$	$-3/28$	0	$23/7$
x_2	0	1	0	$-1/28$	$1/7$	$-1/28$	0	$10/7$
x_3	0	0	1	$-1/28$	$-5/14$	$13/28$	0	$31/7$
u_4	0	0	0	$-1/28$	$-5/14$	$13/28$	1	$-4/7$
	0	0	0	1	6	2	0	208

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	11/28	-1/14	-3/28	0	23/7
x_2	0	1	0	-1/28	1/7	-1/28	0	10/7
x_3	0	0	1	-1/28	-5/14	13/28	0	31/7
$\leftarrow u_4$	0	0	0	-1/28	-5/14	13/28	1	-4/7
	0	0	0	1	6	2	0	208

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	11/28	-1/14	-3/28	0	23/7
x_2	0	1	0	-1/28	1/7	-1/28	0	10/7
x_3	0	0	1	-1/28	-5/14	13/28	0	31/7
u_4	0	0	0	-1/28	-5/14	13/28	1	-4/7
	0	0	0	1	6	2	0	208

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	11/28	-1/14	-3/28	0	23/7
x_2	0	1	0	-1/28	1/7	-1/28	0	10/7
x_3	0	0	1	-1/28	-5/14	13/28	0	31/7
	0	0	0	1/10	1	-13/10	-14/5	8/5
	0	0	0	1	6	2	0	208

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	$2/5$	0	$-1/5$	$-1/5$	$17/5$
x_2	0	1	0	$-1/20$	0	$3/20$	$2/5$	$6/5$
x_3	0	0	1	0	0	0	-1	5
u_2	0	0	0	$1/10$	1	$-13/10$	$-14/5$	$8/5$
	0	0	0	$2/5$	0	$49/5$	$84/5$	$992/5$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	$2/5$	0	$-1/5$	$-1/5$	$17/5$
x_2	0	1	0	$-1/20$	0	$3/20$	$2/5$	$6/5$
x_3	0	0	1	0	0	0	-1	5
u_2	0	0	0	$1/10$	1	$-13/10$	$-14/5$	$8/5$
	0	0	0	$2/5$	0	$49/5$	$84/5$	$992/5$

Right child:

$z = 992/5 = 198\frac{2}{5}$
$x_1 = 17/5 = 3\frac{2}{5}$
$x_2 = 6/5 = 1\frac{1}{5}$
$x_3 = 5$

Branch the leaf:

$z = 2680/13 = 206\frac{2}{13}$
$x_1 = 44/13 = 3\frac{5}{13}$
$x_2 = 19/13 = 1\frac{6}{13}$
$x_3 = 4$

New constraints: $x_1 \leq 3$ and $x_1 \geq 4$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	5/13	-2/13	0	-3/13	44/13
x_2	0	1	0	-1/26	3/26	0	-1/13	19/13
x_3	0	0	1	0	0	0	1	4
u_3	0	0	0	-1/13	-10/13	1	-28/13	12/13
	0	0	0	15/13	98/13	0	56/13	2680/13

Add constraint: $x_1 \leq 3$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	$5/13$	$-2/13$	0	$-3/13$	0	$44/13$
x_2	0	1	0	$-1/26$	$3/26$	0	$-1/13$	0	$19/13$
x_3	0	0	1	0	0	0	1	0	4
u_3	0	0	0	$-1/13$	$-10/13$	1	$-28/13$	0	$12/13$
u_5	1	0	0	0	0	0	0	1	3
	0	0	0	$15/13$	$98/13$	0	$56/13$	0	$2680/13$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	$5/13$	$-2/13$	0	$-3/13$	0	$44/13$
x_2	0	1	0	$-1/26$	$3/26$	0	$-1/13$	0	$19/13$
x_3	0	0	1	0	0	0	1	0	4
u_3	0	0	0	$-1/13$	$-10/13$	1	$-28/13$	0	$12/13$
u_5	1	0	0	0	0	0	0	1	3
	0	0	0	$15/13$	$98/13$	0	$56/13$	0	$2680/13$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	$5/13$	$-2/13$	0	$-3/13$	0	$44/13$
x_2	0	1	0	$-1/26$	$3/26$	0	$-1/13$	0	$19/13$
x_3	0	0	1	0	0	0	1	0	4
u_3	0	0	0	$-1/13$	$-10/13$	1	$-28/13$	0	$12/13$
u_5	0	0	0	$-5/13$	$2/13$	0	$3/13$	1	$-5/13$
	0	0	0	$15/13$	$98/13$	0	$56/13$	0	$2680/13$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	$5/13$	$-2/13$	0	$-3/13$	0	$44/13$
x_2	0	1	0	$-1/26$	$3/26$	0	$-1/13$	0	$19/13$
x_3	0	0	1	0	0	0	1	0	4
u_3	0	0	0	$-1/13$	$-10/13$	1	$-28/13$	0	$12/13$
$\leftarrow u_5$	0	0	0	$-5/13$	$2/13$	0	$3/13$	1	$-5/13$
	0	0	0	$15/13$	$98/13$	0	$56/13$	0	$2680/13$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	5/13	-2/13	0	-3/13	0	44/13
x_2	0	1	0	-1/26	3/26	0	-1/13	0	19/13
x_3	0	0	1	0	0	0	1	0	4
u_3	0	0	0	-1/13	-10/13	1	-28/13	0	12/13
u_5	0	0	0	-5/13	2/13	0	3/13	1	-5/13
	0	0	0	15/13	98/13	0	56/13	0	2680/13

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	5/13	-2/13	0	-3/13	0	44/13
x_2	0	1	0	-1/26	3/26	0	-1/13	0	19/13
x_3	0	0	1	0	0	0	1	0	4
u_3	0	0	0	-1/13	-10/13	1	-28/13	0	12/13
u_5	0	0	0	1	-2/5	0	-3/5	-13/5	1
	0	0	0	15/13	98/13	0	56/13	0	2680/13

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	0	0	0	0	1	3
x_2	0	1	0	0	1/10	0	-1/10	-1/10	3/2
x_3	0	0	1	0	0	0	1	0	4
u_3	0	0	0	0	-4/5	1	-11/5	-1/5	1
u_1	0	0	0	1	-2/5	0	-3/5	-13/5	1
	0	0	0	0	8	0	5	3	205

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	0	0	0	0	1	3
x_2	0	1	0	0	1/10	0	-1/10	-1/10	3/2
x_3	0	0	1	0	0	0	1	0	4
u_3	0	0	0	0	-4/5	1	-11/5	-1/5	1
u_1	0	0	0	1	-2/5	0	-3/5	-13/5	1
	0	0	0	0	8	0	5	3	205

Left child:

$z = 205$
$x_1 = 3$
$x_2 = 3/2 = 1\frac{1}{2}$
$x_3 = 4$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	
x_1	1	0	0	5/13	-2/13	0	-3/13	44/13
x_2	0	1	0	-1/26	3/26	0	-1/13	19/13
x_3	0	0	1	0	0	0	1	4
u_3	0	0	0	-1/13	-10/13	1	-28/13	12/13
	0	0	0	15/13	98/13	0	56/13	2680/13

Add constraint: $x_1 \geq 4$


	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	$5/13$	$-2/13$	0	$-3/13$	0	$44/13$
x_2	0	1	0	$-1/26$	$3/26$	0	$-1/13$	0	$19/13$
x_3	0	0	1	0	0	0	1	0	4
u_3	0	0	0	$-1/13$	$-10/13$	1	$-28/13$	0	$12/13$
u_5	-1	0	0	0	0	0	0	1	-4
	0	0	0	$15/13$	$98/13$	0	$56/13$	0	$2680/13$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	$5/13$	$-2/13$	0	$-3/13$	0	$44/13$
x_2	0	1	0	$-1/26$	$3/26$	0	$-1/13$	0	$19/13$
x_3	0	0	1	0	0	0	1	0	4
u_3	0	0	0	$-1/13$	$-10/13$	1	$-28/13$	0	$12/13$
u_5	-1	0	0	0	0	0	0	1	-4
	0	0	0	$15/13$	$98/13$	0	$56/13$	0	$2680/13$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	$5/13$	$-2/13$	0	$-3/13$	0	$44/13$
x_2	0	1	0	$-1/26$	$3/26$	0	$-1/13$	0	$19/13$
x_3	0	0	1	0	0	0	1	0	4
u_3	0	0	0	$-1/13$	$-10/13$	1	$-28/13$	0	$12/13$
u_5	0	0	0	$5/13$	$-2/13$	0	$-3/13$	1	$-8/13$
	0	0	0	$15/13$	$98/13$	0	$56/13$	0	$2680/13$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	$5/13$	$-2/13$	0	$-3/13$	0	$44/13$
x_2	0	1	0	$-1/26$	$3/26$	0	$-1/13$	0	$19/13$
x_3	0	0	1	0	0	0	1	0	4
u_3	0	0	0	$-1/13$	$-10/13$	1	$-28/13$	0	$12/13$
$\leftarrow u_5$	0	0	0	$5/13$	$-2/13$	0	$-3/13$	1	$-8/13$
	0	0	0	$15/13$	$98/13$	0	$56/13$	0	$2680/13$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	$5/13$	$-2/13$	0	$-3/13$	0	$44/13$
x_2	0	1	0	$-1/26$	$3/26$	0	$-1/13$	0	$19/13$
x_3	0	0	1	0	0	0	1	0	4
u_3	0	0	0	$-1/13$	$-10/13$	1	$-28/13$	0	$12/13$
u_5	0	0	0	$5/13$	$-2/13$	0	$-3/13$	1	$-8/13$
	0	0	0	$15/13$	$98/13$	0	$56/13$	0	$2680/13$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	$5/13$	$-2/13$	0	$-3/13$	0	$44/13$
x_2	0	1	0	$-1/26$	$3/26$	0	$-1/13$	0	$19/13$
x_3	0	0	1	0	0	0	1	0	4
u_3	0	0	0	$-1/13$	$-10/13$	1	$-28/13$	0	$12/13$
	0	0	0	$-5/3$	$2/3$	0	1	$-13/3$	$8/3$
	0	0	0	$15/13$	$98/13$	0	$56/13$	0	$2680/13$

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	0	0	0	0	-1	4
x_2	0	1	0	-1/6	1/6	0	0	-1/3	5/3
x_3	0	0	1	5/3	-2/3	0	0	13/3	4/3
u_3	0	0	0	-11/3	2/3	1	0	-28/3	20/3
u_4	0	0	0	-5/3	2/3	0	1	-13/3	8/3
	0	0	0	25/3	14/3	0	0	56/3	584/3

	x_1	x_2	x_3	u_1	u_2	u_3	u_4	u_5	
x_1	1	0	0	0	0	0	0	-1	4
x_2	0	1	0	-1/6	1/6	0	0	-1/3	5/3
x_3	0	0	1	5/3	-2/3	0	0	13/3	4/3
u_3	0	0	0	-11/3	2/3	1	0	-28/3	20/3
u_4	0	0	0	-5/3	2/3	0	1	-13/3	8/3
	0	0	0	25/3	14/3	0	0	56/3	584/3

Right child:

$z = 584/3 = 194\frac{2}{3}$
$x_1 = 4$
$x_2 = 5/3 = 1\frac{2}{3}$
$x_3 = 4/3 = 1\frac{1}{3}$