

#1

Maximize $P = -24x - 18y - 24z$

$$3x + 2y + z - s = 4$$

$$x + y + 3z + t = 6$$

$$24x + 18y + 24z + P = 0$$

-4, 1
cell

	x	y	z	s	t	P	constants
s	3	2	1	-1	0	0	4
t	1	1	3	0	1	0	6
P	24	18	24	0	0	1	0

#2

$$x + 2y + 3z + s = 28$$

$$2x + 3y - z + t = 6$$

$$x - 2y + z - u = 4$$

$$-2x - y - z + P = 0$$

28, 6, -4, *

	x	y	z	s	t	u	P	constants
s	1	2	3	1	0	0	0	28
t	2	3	-1	0	1	0	0	6
u	1	-2	1	0	0	-1	0	4
P	-2	-1	-1	0	0	0	1	0

either

#3a

$$\begin{aligned}x &= 18/5 \\y &= 0 \\z &= 3/5 \\s &= 0 \\t &= -3/5 \\u &= 0 \\p &= -99/5\end{aligned}$$

#3b

Phase I

#3c

#4

$$\begin{aligned}& 4 \begin{bmatrix} 1 & 3 & -2 \\ 5 & 9 & 7 \\ -4 & 0 & 6 \end{bmatrix} - 6 \begin{bmatrix} 8 & -3 & 2 \\ 2 & 5 & 9 \\ 0 & 4 & 1 \end{bmatrix} \\&= \begin{bmatrix} 4 & 12 & -8 \\ 20 & 36 & 28 \\ -16 & 0 & 24 \end{bmatrix} - \begin{bmatrix} 48 & -18 & 12 \\ 12 & 30 & 54 \\ 0 & 24 & 6 \end{bmatrix} \\&= \begin{bmatrix} -44 & 30 & -20 \\ 8 & 6 & -26 \\ -16 & -24 & 18 \end{bmatrix}\end{aligned}$$

3. The following tableau is neither an initial tableau nor a final tableau.

	x	y	z	s	t	u	p	constants
z	0	-2	5	-3	0	-2	0	3
* t	0	3	0	-3	-15	-12	0	3
x	15	3	0	-3	0	3	0	18
p	0	666	0	249	0	-84	15	-999

$-3/2$
 $3/3$
 $18/3$

3a. Determine the values of $x, y, z, s, t, u,$ and p at this stage.

3b. Is this tableau in phase I or phase II?

3c. Determine the pivot.

4. Evaluate $4 \begin{bmatrix} 1 & 3 & -2 \\ 5 & 9 & 7 \\ -4 & 0 & 6 \end{bmatrix} - 6 \begin{bmatrix} 8 & -3 & 2 \\ 2 & 5 & 9 \\ 0 & 4 & 1 \end{bmatrix}$.

5. Compute the product $\begin{bmatrix} 3 & 1 & 4 \\ -1 & 2 & 3 \end{bmatrix} \begin{bmatrix} 1 & 3 & -3 \\ 4 & -2 & 2 \\ 2 & 4 & 1 \end{bmatrix}$.

6. Translate the given system of linear equations into matrix form.

$$\begin{aligned} 3x - 5y + 4z &= 10 \\ 4x + 2y - 3z &= -12 \\ -x &+ z = -2 \end{aligned}$$

#5

$$\begin{bmatrix} 3 & 1 & 4 \\ -1 & 2 & 3 \end{bmatrix} \begin{bmatrix} 1 & 3 & -3 \\ 4 & -2 & 3 \\ 2 & 4 & 1 \end{bmatrix}$$

2×3 3×3

$$= \begin{bmatrix} 15 & 23 & -3 \\ 13 & 5 & 10 \end{bmatrix}$$

2×3

#6

$$\begin{bmatrix} 3 & -5 & 4 \\ 4 & 2 & -3 \\ -1 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 16 \\ -12 \\ -2 \end{bmatrix}$$

#7

$$\begin{array}{c} A \\ \left[\begin{array}{ccc|ccc} 2 & 1 & 3 & 1 & 0 & 0 \\ 3 & 1 & 3 & 0 & 1 & 0 \\ 2 & 1 & 2 & 0 & 0 & 1 \end{array} \right] \end{array} \quad \begin{array}{c} H \\ \left[\begin{array}{ccc|ccc} 2 & 1 & 1 & 1 & 0 & 0 \\ 0 & 0 & -1 & -3 & 2 & 0 \\ 0 & 0 & 1 & -1 & 0 & 1 \end{array} \right] \end{array}$$

$$\begin{array}{c} \left[\begin{array}{ccc|ccc} 2 & 0 & 2 & 4 & -2 & 0 \\ 0 & 0 & -1 & -3 & 2 & 0 \\ 0 & 0 & 1 & -1 & 0 & 1 \end{array} \right] \end{array} \quad \begin{array}{c} \left[\begin{array}{ccc|ccc} 2 & 0 & 0 & 6 & -2 & -2 \\ 0 & 0 & 0 & -4 & 2 & 1 \\ 0 & 0 & 0 & -1 & 0 & 1 \end{array} \right] \end{array}$$

$$\begin{array}{c} \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & 3 & -1 & -1 \\ 0 & 1 & 0 & -4 & 2 & 1 \\ 0 & 0 & 1 & -1 & 0 & 1 \end{array} \right] \end{array}$$

H A⁻¹

#8

$$\begin{bmatrix} 2 & 1 & -1 \\ 1 & 1 & -1 \\ -1 & -2 & 3 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 5 \\ 4 \\ -8 \end{bmatrix}$$

$$\begin{bmatrix} 1 & -1 & 0 \\ -2 & 5 & 1 \\ -1 & 3 & 1 \end{bmatrix} \begin{bmatrix} 2 & 1 & -1 \\ 1 & 1 & -1 \\ -1 & -2 & 3 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 & -1 & 0 \\ -2 & 5 & 1 \\ -1 & 3 & 1 \end{bmatrix} \begin{bmatrix} 5 \\ 4 \\ -8 \end{bmatrix}$$

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}$$

$$x = 1$$

$$y = 2$$

$$z = -1$$