

The following are some sample problems. Review the homework (and problems near the homework problems in the exercise sets). The more problems you do, the better.

1. Solve the system of equations

$$\begin{aligned} 2x + 4y &= -8 \\ 3x + y &= 3. \end{aligned}$$

2. Do the row reduction for the following matrix

$$\begin{bmatrix} 1 & 0 & 1 & 3 \\ 1 & 2 & 3 & 7 \\ 0 & 1 & 2 & 2 \end{bmatrix}.$$

3. A friend shows you the following work. There is an error in every step. Explain why you know the answer is wrong and find the errors.

Solve

$$\begin{aligned} x + y + z &= 4 \\ 2x + 4y &= 6 \\ 3x - z &= 1 \end{aligned}$$

$$\begin{bmatrix} 1 & 1 & 1 & 4 \\ 2 & 4 & 0 & 6 \\ 3 & 0 & 1 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 1 & 4 \\ 0 & 2 & -2 & 2 \\ 3 & 0 & 1 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 1 & 4 \\ 0 & 2 & -2 & 2 \\ 0 & -1 & 0 & -10 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 1 & 4 \\ 0 & -1 & 0 & -10 \\ 0 & 2 & -2 & 2 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 1 & 1 & 4 \\ 0 & -1 & 0 & -10 \\ 0 & 0 & -2 & -22 \end{bmatrix}$$

So $z = -11$, $y = 10$ and $x + 10 - 11 = 4$ so $x = 5$.

4. Explain why the solution set of

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

is what it is.

5. Set up the equations for problem 85 page 312 and write them in matrix form.
6. Set up the equations for problem 84 page 312 and write them in matrix form.

7. Set up the relevant equations for problem 88 page 313 (in equation and matrix form).
8. Set up the relevant equations for problem 90 page 313 (in equation and matrix form).
9. Solve the system of equations

$$\begin{aligned}x + y + z &= 3 \\x + 2y + z &= 4 \\2x + 3y + 2z &= 7\end{aligned}$$

10. Is

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

the inverse of

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

11. Suppose a company has two departments that must buy supplies in the amounts given as follows:

	Dept 1	Dept 2
paper	10	20
pens	6	8
pencils	3	7

The cost is given by

	Cost
paper	6
pen	2
pencils	3

Write the total cost per department as a matrix multiplication and justify carefully your answer.

12. Suppose 31 people order hot dogs, 25 people order hamburgers and 8 people order salads. If 16 of the people that order hamburgers order only hamburgers and the rest order both hamburgers and hot dogs.
 - (a) If H is the set of people who order hamburgers, D is the set of people who order hot dogs and S is the set of people who order salads, how many people are in $H \cap D$ and $H \cup D$.
 - (b) How many people are in the set $D \cap H'$ and how could you describe the people in this set.
 - (c) If one person who orders a salad orders a hot dog and none of them order a hamburger, what is the total number of people.