Chapter 3 Systems of Linear Equations and Introduction to Determinants (Summary)

Exercises / Section 3.1 (page 84)

- Solve the following systems of equations graphically.

Problem # 1. $\begin{aligned} 2x-y&=1\\ x-y&=2 \end{aligned}$, Problem # 5. $\begin{aligned} -x-3y&=4\\ 2x+2y&=5 \end{aligned}$ Problem # 7. $\begin{aligned} 2x+3y&=2\\ 3x+2y&=1 \end{aligned}$

Problem # 9. $\begin{aligned} 5x-2y&=9\\ 4x-3y&=4 \end{aligned}$ Problem # 11. $\begin{aligned} 3x+y&=0\\ x-2y&=20 \end{aligned}$

(**Problems solved in** class # 1, 11) **HW**: Problem # 5, # 7, # 9

Exercises / Section 3.2 (page 90-91)

- Solve the following systems of equations by the method of addition or subtraction.

Problem # 1. $\begin{aligned} x+y&=4\\ 2x-y&=5 \end{aligned}$ Problem # 5. $\begin{aligned} 3x-2y&=21\\ 4x-5y&=42 \end{aligned}$

Problem # 7. $\begin{aligned} 4x-3y&=-11\\ 12x+25y&=69 \end{aligned}$ Problem # 9. $\begin{aligned} 2x+2y&=1\\ 5x-5y&=1 \end{aligned}$

- Solve the following systems of equations by the method of substitution.

Problem # 15. $\begin{aligned} 2x+y&=1\\ x+3y&=8 \end{aligned}$ Problem # 17. $\begin{aligned} 8x-10y&=-13\\ x+2y&=0 \end{aligned}$ Problem # 19. $\begin{aligned} 5x+2y&=3\\ 6x+3y&=2 \end{aligned}$

- Solve the following systems of equations by either method. Problem # 23. $\begin{aligned} 3x-2y&=1\\ 6x-4y&=5 \end{aligned}$

Problem # 27. $\begin{aligned} \frac{2}{x}-\frac{3}{y}&=1\\ \frac{3}{x}-\frac{2}{y}&=2 \end{aligned}$ Problem # 35. $\begin{aligned} 2w-3z&=5\\ 4w-6z&=10 \end{aligned}$ Problem # 37. $\begin{aligned} -2v+5w&=10\\ 4v-10w&=15 \end{aligned}$

(**Problems solved in class** # 1, 9, 15, 23, 35) **HW**: Problem # 5, 7, 17, 19, 27, 37

Exercises / Section 3.3 (page 95-96)

- Expand each determinant. Problem # 3. $\begin{vmatrix} -2 & 4\\ 4 & -8 \end{vmatrix}$

Problem # 9. $\begin{vmatrix} -2 & -1\\ 12 & 5 \end{vmatrix}$ Problem # 13. $\begin{vmatrix} 32 & 21\\ -17 & 16 \end{vmatrix}$ Problem # 15. $\begin{vmatrix} 18 & -6\\ 75 & 0 \end{vmatrix}$

- Solve the following systems of equations by using Cramer rule. Problem # 17. $\begin{aligned} 3x+4y&=1\\ 2x+3y&=4 \end{aligned}$

Problem # 25. $\begin{aligned} \frac{2}{x}-\frac{3}{y}&=7\\ \frac{1}{x}+\frac{5}{y}&=3 \end{aligned}$ Problem # 31. $\begin{aligned} F_1+2F_2&=5\\ 2F_1+F_2&=6 \end{aligned}$ Problem # 33. $\begin{aligned} 3R_1+4R_2&=20\\ 4R_1+2R_2&=15 \end{aligned}$

(Problems solved in class # 3, 15, 17, 31) **HW**: Problem # 9, 13, 25, 33

Exercises / Section 3.4 (page 99-101)

Problem # 1. In figure 3.10 the moment of weight W is 5. The lever balances when $d_1 = 2\ ft$ and $d_2 = 1\ ft$ and when $d_1 = 1\ ft$ and $d_2 = 3\ ft$. Determine the weights w_1 and w_2.

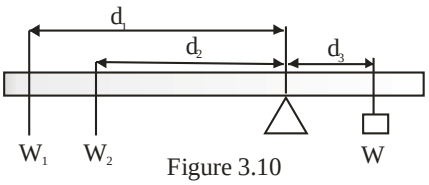


Figure 3.10

Problem # 7. Two resistors connected in series have a combined resistance of 150 Ω. If the resistance of one resistor is 10 Ω less than the other, find the resistance of each.

Problem # 15. The sum of the voltages across two resistors is 55.1 V. It was found that 3 times the first voltage is 9.7 V less than 4 times the second. What are the two voltages?

Problem # 17. Tickets for an industrial exhibit cost $5.00 for regular admission and $4.00 for senior citizens. On one day 215 tickets were sold for total intake of $1050. How many tickets of each type were sold?

Problem # 21. Two machines have a total of 62 moving parts. If one machine has 2 more than 3 times as many moving parts as the other, how many moving parts does each machine have?

Problem # 25. One consultant to a firm charges $200 per day, and another consultant charges $250 per day. After 13 days the total charged by the two consultants comes to $2950. Assuming that only one of the two consultants was called in on any one day, how many days did each one work?

(Problems solved in class # 1, 17) **HW**: Problem # 7, # 15, # 25

Exercises / Section 3.5 (page 103)

- Solve the following systems of equations

Problem # 3. $\begin{aligned} 3x+2z&=-1\\ 4x-y-2z&=7\\ x+y&=2 \end{aligned}$

Problem # 7. $\begin{aligned} 2x-y+3z&=16\\ 3x+4y+2z&=7\\ 5x-6y+8z&=47 \end{aligned}$

Problem # 11. $\begin{aligned} \frac{2}{x}-\frac{1}{y}+\frac{2}{z}&=2\\ -\frac{4}{x}+\frac{5}{y}-\frac{3}{z}&=1\\ \frac{3}{x}-\frac{4}{y}+\frac{1}{z}&=3 \end{aligned}$

(Problems solved in class # 11) HW: Problem # 3, # 7

Exercises / Section 3.6 (page 111-114)

Problem # 5. $\begin{vmatrix} 2 & -1 & 3\\ 3 & 0 & -5\\ 10 & 5 & -10 \end{vmatrix}$

Problem # 7. $\begin{vmatrix} 2 & 3 & 8\\ -1 & 3 & -2\\ 5 & -6 & -12 \end{vmatrix}$

Problem # 11. $\begin{vmatrix} -3 & -4 & -7\\ 3 & 0 & -6\\ 10 & 15 & 18 \end{vmatrix}$

- Solve the system of equation by Cramer's rule:

Problem # 19. $\begin{aligned} 2x-y+3z&=16\\ 3x+4y+2z&=7\\ 5x-6y+8z&=47 \end{aligned}$

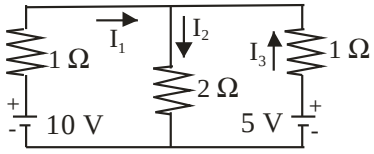
Problem # 21 $\begin{aligned} 2x-3y+z&=1\\ x-2y-3z&=1\\ x-4y+2z&=2 \end{aligned}$,

Problem # 25 A portion of $ 5950 was invested at 8 %, another portion at 10 %, and the rest at 12 %. The total interest income was $ 635. If the sun of the second investment and twice the first investment was $ 750 more than the third investment, find the amount invested in each rate.

Problem # 27 Three machine parts cost a total of $ 40. The first part costs as much as the other two together, while the cost of 6 times the second is $ 2 more than the total cost of the other two. Find the cost of each part.

Problem # 31 Find the currents of the circuits by solving the system of equations given

Problem 31



$\begin{aligned} I_1 - I_2 + I_3 &= 0\\ I_1 + 2I_2 &= 10\\ -2I_2 - I_3 &= -5 \end{aligned}$

Problem # 33 $\begin{aligned} -I_1 + I_2 + I_3 &= 0\\ -I_1 - 3I_2 &= -10\\ 3I_2 - 5I_3 &= -6 \end{aligned}$

(Problems solved in class # 7, 27, 33). **HW:** Problem # 5, 11, 19, 21, 25, 31