

Math 110 – Chapter 5 – Worksheet 1 – Version A

Systems of Linear Equations in Two Variables; Systems of Linear Equations in Three Variables; Partial-Fraction Decomposition

Section 5.1 Systems of Linear Equations in Two Variables

1. Solve the system graphically and check.

$$\begin{cases} x + y = 2 \\ 4x + y = -1 \end{cases}$$

2. Solve the system by the substitution method.

$$\begin{cases} x - y = 5 \\ 2x + y = 7 \end{cases}$$

3. Solve the system by the elimination (addition) method.

$$\begin{cases} 3x + 2y = 3 \\ 9x - 4y = 4 \end{cases}$$

4. Solve and inconsistent system.

$$\begin{cases} x - 3y = 5 \\ -2x + 6y = 15 \end{cases}$$

5. Solve a dependent system.

$$\begin{cases} 4x - 2y = 6 \\ y = 2x - 3 \end{cases}$$

6. Solve a nonlinear system by a linearizing substitution.

$$\begin{cases} \frac{4}{x} + \frac{3}{y} = 1 \\ \frac{2}{x} - \frac{6}{y} = 3 \end{cases}$$

7. Find the equilibrium point of the following supply and demand functions:

$$\begin{cases} p = 20 + 0.02x & (\text{Supply equation}) \\ p = 77 - 0.008x & (\text{Demand equation}) \end{cases}$$

8. Mellissa invested part of \$150,000 in a high-risk investment and received 12% at the end of the year. The rest was invested at 8% annual return. The combined income from the two investments was \$15,400. How much was invested at each rate?

Section 5.2 Systems of Linear Equations in Three Variables

9. Solve the system of linear equations.

$$\begin{cases} 2x + 5y = 1 \\ x - 3y + 2z = 1 \\ -x + 2y + z = 7 \end{cases}$$

10. Solve the system of linear equations.

$$\begin{cases} 2x + 2y + 2z = 12 \\ -3x + y - 11z = -6 \\ 2x + y + 4z = -8 \end{cases}$$

11. Solve the system of linear equations.

$$\begin{cases} x + y + z = 5 \\ -4x - y - 8z = -29 \\ 2x + 5y - 2z = 1 \end{cases}$$

12. Solve the system of linear equations.

$$\begin{cases} x + 3y + 2z = 4 \\ 2x + 7y - z = 5 \end{cases}$$

Section 5.3 Partial-Fraction Decomposition

13. Find the partial-fraction decomposition of the rational expression

$$\frac{2x - 7}{(x + 1)(x - 2)}$$

14. Find the partial-fraction decomposition of the rational expression

$$\frac{3x^2 + 4x + 3}{x^3 - x}$$

15. Find the partial-fraction decomposition of the rational expression

$$\frac{x + 5}{x(x - 1)^2}$$

16. Find the partial-fraction decomposition of the rational expression

$$\frac{3x^2 + 5x - 2}{x(x^2 + 2)}$$