

Written Assignment 6

4 points each

7.1

Algebraic

For the following exercises, determine whether the given ordered pair is a solution to the system of equations.

1. $y + 3x = 5$ and $2x + y = 10$ and $(1, 8)$

For the following exercises, solve each system by substitution.

2. $3x - y = 4$ and $2x + 2y = 12$

For the following exercises, solve each system by addition.

3. $7x + y = 15$ and $-2x + 3y = -1$

For the following exercises, solve each system by any method.

4. $x + 2y = -4$ and $3y - 2x = -13$

Graphical

For the following exercises, graph the system of equations and state whether the system is consistent, inconsistent, or dependent and whether the system has one solution, no solution, or infinite solutions.

5. $5x + 3y = 12$ and $-10x - 6y = 8$

Real-World Applications

For the following exercises, solve for the desired quantity.

6. The top band in the state charges $C(x) = 55x + 15,000$, where x is the total number of attendees at the concert. The venue charges \$70 per ticket. After how many people buy tickets does the venue break even, and what is the value of the total tickets sold at that point?

For the following exercises, use a system of linear equations with two variables and two equations to solve.

7. The startup cost for a boutique is \$15,000, and each floral arrangement costs \$17 for the boutique to make. If each arrangement is then sold for \$25, after how many arrangements does the boutique break even?
8. If a scientist mixed 15% saline solution with 48% saline solution to get 20 gallons of 35% saline solution, how many gallons of 15% and 48% solutions were mixed? Round each to the nearest whole gallon.
9. Admission into an amusement park for 4 children and 2 adults is \$133.50. For 6 children and 4 adults, the admission is \$235.50. Assuming a different price for children and adults, what is the price of the child ticket and the price of the adult ticket?

7.2

Algebraic

For the following exercises, determine whether the ordered triple given is the solution to the system of equations.

10. $2x - 3y + 4z = 3$, $-x + 5y + 2z = 10$, $3x - 4y - z = -9$ and $(-1, 1, 2)$

For the following exercises, solve each system by substitution.

11. $x - 3y + 5z = 29$, $3x + y - 4z = -9$, $4x - 3y + 7z = 46$

For the following exercises, solve each system by Gaussian elimination.

12. $x + y + z = 6$, $3x - 2y + 4z = 37$, $-4x + 3y - 6z = -53$

For the following exercises, solve each system by any method.

13. $\frac{1}{3}x + \frac{2}{5}y + \frac{1}{9}z = 1$, $\frac{1}{6}x - \frac{3}{5}y + \frac{2}{3}z = 10$, $\frac{5}{6}x + \frac{4}{5}y - \frac{7}{9}z = -6$

Real-World Applications

14. An animal shelter has a total of 254 animals comprised of cats, dogs, and guinea pigs. If the number of guinea pigs is one third the number of dogs, and there are 40 more dogs than cats, how many of each animal are at the shelter?

15. The top three countries in oil consumption in a certain year are as follows: the United States, China, and Japan. In millions of barrels per day, the three top countries consumed 32.2 million barrels of the world's oil. The United States consumes 12 million more barrels a day than China. China consumes 3.2 million

barrels a day than Japan. How many barrels of the world oil consumption did the United States, Japan, and China consume?

7.3

Algebraic

For the following exercises, solve the system of nonlinear equations using substitution. Simplify any fractions or radicals to lowest terms.

16. $x - y = 4$ and $x^2 + y^2 = 25$

For the following exercises, solve the system of nonlinear equations using elimination.

17. $3x^2 - 4y^2 = 36$ and $2x^2 + 4y^2 = 29$

For the following exercises, use any method to solve the system of nonlinear equations.

18. $2x^2 - y^2 = -16$ and $x + y = 4$

19. $x - 4y = 1$ and $x^2 + 3y^2 = 3$

Graphical

For the following exercises, graph the inequality.

20. $x^2 + 2y > 7$

21. $y^2 - 2x^2 > -3$ and $x^2 + y^2 < 9$

Extensions

For the following exercises, graph the inequality.

22. $y \geq \left(\frac{1}{3}\right)^x$

23. $y < 3^{0.2x} + 1$

Real-World Applications

For the following exercises, construct a system of nonlinear equations to describe the given behavior, then solve for the requested solutions.

24. Two numbers add up to 144. One number is half the square of the other number.

What are the numbers?

25. The squares of two numbers add to 1,156. The second number is the square root of three times the square of the first number. What are the numbers?