Graph the following linear equations using slope-intercept form.





Graph the following systems of equations and estimate the solution from the graph.



















Solve the following systems using the substitution method.

1.
$$2x + 8y = 12$$

 $x - 2y = 0$ (2, 1)
3. $y = 5$
 $2x - y = 9$ (7, 5)
4. $y = -\frac{1}{2}x + 1$
 $2x + 3y = 6$ (6, -2)
5. $2x + y = -16$
 $x - 2y = -28$ (-12, 8)
6. $4y = 8$
 $2x + 5y = 11$ ($\frac{1}{2}, 2$)
7. $x + y = 2$
 $-2x + 4y = -19$ (4.5, -2.5)
8. $x + 2y = 4$
 $3x - 4y = -3$ (1, 1.5)
9. $2x + y = 4$
 $2y = -4x + 8$ infinite solutions
10. $x + y = 2$
 $x + y = 5$ no solution

11.
$$y = 3x$$

 $3x + 3y = 4$
 $(\frac{1}{3}, 1)$
12. $y = 2x + 3$
 $y = 4x - 1$
(2,7)

13. x - 3y = 0 $\frac{1}{3}x + y = 2$ (3,1)
14. $2x - \frac{1}{3}y = -9$ -3x + y = 15(-4,3) 15. x = 2 16. 4x = 3y + 3

$$2x + y = 4$$
 (2,0) $x = 2$ (2, $\frac{5}{3}$)

17.
$$\frac{3}{2}x = 2y$$

 $y = x - 1$ (4,3)
18. $x - 2y = -1$
 $3y = x + 4$ (5,3)

19.
$$x + 2y = 0$$

 $3x + 4y = 4$ 20. $2y = -6$
 $x + 2y = -1$ (5, -3)

- 21.x 4y = 1
2x 8y = 222.x 2y = 3
4x 8y = 12infinite solutionsinfinite solutions
- 23. x = 03x - 6y = 12 (0, -2) 24. x = 2y - 3x = 2y + 4 no solution
- 25. 2x 3y = -24 $x + \frac{1}{4}y = -5$ (-6,4) 26. $\frac{2}{3}x - 2y = 12$ x = -2y - 2 (6,-4)
- 27. x + y = 6 2y = -2x + 2 no solution 28. x + 2y = 72x - 8y = 8 (6, $\frac{1}{2}$)
- 29.2x = 6y 14
3y x = 730.y = -x + 3
2y + 2x = 4no solution

Write and solve a system of equations using any method (graphing, elimination, or substitution) for each of the following situations.

31. Leonard sells small watermelons for \$7 each and large watermelons for \$10 each. One day the number of small watermelons he sold was fifteen more than the number of large watermelons, and he made a total of \$394. How many small and how many large watermelons did he sell?

32 small watermelons and 17 large watermelons

32. The perimeter of a rectangle is 28 cm. The length of the rectangle is 2 cm more than twice the width. Find the dimensions of the rectangle.

Length = 10 cm; width = 4 cm

33. The sum of Julian's and Kira's age is 58. Kira is fourteen less than twice as old as Julian. What are their ages? Julian is 24 years old and Kira is 34 years old

34. A 3% solution of sulfuric acid was mixed with an 18% solution of sulfuric acid to produce an 8% solution.
How much 3% solution and how much 18% solution were used to produce 15 L of 8% solution?
10 L of the 3% solution and 5 L of the 18% solution

35. Supplementary angles are two angles whose measures have the sum of 180 degrees. Angles X and Y are supplementary, and the measure of angle X is 24 degrees greater than the measure of angle Y. Find the measures of angles X and Y.

Measure of angle $X = 102^{\circ}$; measure of angle $Y = 78^{\circ}$

36. At the end of the 2000 baseball season, the New York Yankees and the Cincinnati Reds had won a total of 31 World Series. The Yankees had won 5.2 times as many World Series as the Reds. How many World Series did each team win?

Yankees won 26 World Series and Reds won 5 World Series

37. Peanuts worth \$2.25 a pound were mixed with cashews worth \$3.25 a pound to produce a mixture worth \$2.65 a pound. How many pounds of each kind of nuts were used to produce 35 pounds of the mixture?
 21 pounds of peanuts and 14 pounds of cashews

38. Ernesto spent a total of \$64 for a pair of jeans and a shirt. The jeans cost \$6 more than the shirt. What was the cost of the jeans?

Jeans cost \$35; shirt cost \$29

39. The perimeter of a rectangular garden is 68 feet. The length of the garden is 4 more than twice the width. What are the dimensions of the garden?

Length = 24 *feet*; width = 10 *feet*

40. The Future Teachers of America Club at Paint Branch High School is making a healthy trail mix to sell to students during lunch. The mix will have three times the number of pounds of raisins as sunflower seeds. Sunflower seeds cost \$4.00 per pound, and raisins cost \$1.50 per pound. If the group has \$34.00 to spend on the raisins and sunflower seeds, how many pounds of each should they buy?

12 pounds of raisins and 4 pounds of sunflower seeds

Solve the following systems using the elimination method.

1.
$$x + y = 1$$

 $x - y = 5$ (3,-2)
2. $2x + 3y = 7$
 $-2x + y = 5$ (-1,3)
3. $3x + y = 6$
 $3x - 2y = 9$ ($\frac{7}{3}, -1$)
4. $\frac{1}{2}x + 3y = 1$
 $3x + 3y = 6$ (2,0)
5. $x + y = -3$
 $x - y = 1$ (-1,-2)
6. $4x + y = -9$
 $4x + 2y = -10$ (-2,-1)
7. $\frac{1}{5}x + 2y = -10$
 $2x + 2y = -10$ (0,-5)
8. $-2x + y = 10$
 $4x + y = -8$ (-3,4)
9. $-4x = 4$
 $4x - 3y = -10$ (-1,2)
10. $x = 1$
 $6x - 5y = 11$ (1,-1)

- 11.x 2y = 512.3x + y = 53x 2y = 9 $(2, -\frac{3}{2})$ 2x + y = 10(-5, 20)
- 13. x = 5 2x - 3y = 16(5, -2)
 14. $3x + \frac{3}{2}y = 6$ 3x - 2y = -1(1, 2)

15.
$$4x - 3y = 12$$

 $\frac{2}{3}x + 2y = 12$
(6,4)
16. $-5x + 3y = 6$
 $x - y = 4$
(-9,-13)

17.
$$3y = 6$$
18. $3x + y = 2$ $4x - y = -2$ (0, 2) $6x + 3y = 5$ $(\frac{1}{3}, 1)$

19.
$$x + y = 4$$

 $2x + 2y = 8$ 20. $x + y = 2$
 $2x + 2y = 8$ no solution

21.
$$x + 3y = 12$$

 $2x - 3y = 12$
(8, $\frac{4}{3}$)
22. $2x + 3y = 10$
 $5x + 7y = 24$
(2, 2)

23.
$$5x + 4y = -3$$

 $10x - 2y = -3$
 $(-\frac{9}{25}, -\frac{3}{10})$
24. $5x - 4y = -8$
 $3x + 8y = 3$
 $(-1, \frac{3}{4})$

25.
$$4x - 7y = 10$$

 $3x + 2y = -7$ (-1,-2)
26. $\frac{1}{2}x - 3y = -4$
 $4y = 8$ (4,2)

27.
$$3x - 4y = -10$$

 $5x + 8y = -2$ 28. $4x + 3y = 19$
 $3x - 4y = 8$ (4, 1)

29.
$$4x + \frac{3}{2}y = 17$$

 $6x + 5y = 20$ 30. $3x + 4y = -25$
 $2x = -6$ (-3, -4)

Write and solve a system of equations using any method (graphing, elimination, or substitution) for each of the following situations.

31. The sum of two numbers is 82 and their difference is 26. Find each of the numbers.

54 and 28

32. Kathryn buys 8 cups of coffee and 2 bagels one day and pays \$31. Harry buys 3 cups of coffee and 3 bagels the same day and pays \$17.25. How much is each cup of coffee and each bagel?
\$3.25 for each cup of coffee and \$2.50 for each bagel

33. Farmer Deanna looks out her window and counts a total of 64 legs on a total of 20 animals. If she has only sheep and chickens, how many of each does she have? (*Hint: Sheep have 4 legs each and chickens 2 legs each.*) 12 sheep and 8 chickens

34. Tyler and Pearl went on a 20-kilometer bike ride that lasted 3 hours. Because there were so many steep hills on the bike ride, they had to walk for most of the trip. Their walking speed was 4 kilometers per hour. Their riding speed was 12 kilometers per hour. How much time did they spend walking? 2 hours walking and 1 hour riding

35. A used book store also started selling used CDs and videos. In the first week, the store sold 40 used CDs and videos at \$4.00 per CD and \$6.00 per video. The sales for both CDs and videos totaled \$180.00. How many CDs and videos did the store sell in the first week?

30 CDs and 10 videos

36. A metal alloy is 25% copper. Another metal alloy is 50% copper. How much of each alloy should be used to make 1000 grams of a metal alloy that is 45% copper?

200 grams of the 25% copper metal alloy and 800 grams of the 50% copper metal alloy

37. Dried apricots worth \$3.25 a pound were mixed with dried prunes worth \$4.75 a pound to produce a mixture of dried fruit worth \$3.79 a pound. How much of each kind of fruit was used to produce 25 pounds of mixture? 16 pounds of apricots and 9 pounds of prunes

38. One number added to twice another number is 23. Four times the first number added to twice the other number is 38. What are the numbers?

5 and 9

39. The owners of the River View Restaurant have hired enough servers to handle 17 tables of customers, and the fire marshal has approved the restaurant for a limit of 56 customers. How many two-seat and how many four-seat tables should the owners purchase?

6 two-seat tables and 11 four-seat tables

40. The Rodriguez family and the Wong family went to a brunch buffet. The restaurant charges one price for adults and another price for children. The Rodriguez family has two adults and three children, and their bill was \$40.50. The Wong family has three adults and one child, and their bill was \$38.00. Determine the price of the buffet for an adult and the price for a child.

Adult price = \$10.50 and child price = \$6.50

Decide if the following systems of equations have a single solution, no solutions, or infinite solutions. If it has a solution, solve the system.

1.
$$x + y = 1$$

 $x + y = 5$ 2. $2x + 3y = 7$
 $4x + 5y = 13$ single solution; (2,1)3. $\frac{1}{2}x + 3y = 1$
 $x + 6y = 2$ 4. $x + \frac{1}{3}y = -10$
 $3x + y = 30$ no solution5. $2y = 6$
 $3(x + y) = 12$ single solution; (1,3)6. $x + y = 2$
 $3x + 3y = 6$ infinite solutions7. $x + 5y = 9$
 $x + 5y = 6$ no solution8. $2y = 5$
 $4y = 15$ no solution9. $x + \frac{3}{5}y = 2$
 $y = -2x + 3$ 10. $3x + y = 10$
 $y - 10 = -3x$ infinite solutions11. $3x + y = 5$
 $y = -3x + 5$ 12. $6x + 4y = 10$
 $3y - 10 = -7x$ single solution; (1,1)13. $2x + y = 4$
 $y - 5 = -2x$ 14. $5x - 4y = 3$
 $5x = 4y - 3$ no solution15. $7x + 5y = 3$
 $5y - 3 = -7x$ 16. $\frac{2}{3}x - y = 0$
 $2x = 3y$ infinite solutions17. $4x = 4$
 $2x + 2y = 4$ single solution; (1,1)18. $x = 2$
 $2(x + 4y) = 10$
 $10 no solution18. $x = 2$
 $2(x + 4y) = 4$ single solution; (2,0)19. $x + 4y = 2$
 $2(x + 4y) = 10$ no solution20. $10x = 10 - 2y$
 $5x + y = 5$ infinite solutions$

Write a system of equations for each situation and solve using inspection.

- 21. The sum of two numbers is 100. Twice the first number plus twice the second number is 200. What are the numbers? *infinite solutions*
- 22. The perimeter of a rectangle is 40 in. Twice the length of the rectangle is 20 minus twice the width. What are the length and width? *no solution*
- 23. Coffee worth \$2.95 a pound was mixed with coffee worth \$3.50 a pound to produce a blend worth \$3.30 a pound. How much of each kind of coffee was used to produce 44 pounds of blended coffee?
 28 pounds of coffee worth \$2.95 and pound and 16 pounds of coffee worth \$3.50 a pound
- 24. Jeri has a total of 40 pets with a total of 160 legs. If she owns only cats and dogs, how many of each does she have? *infinite solutions*
- 25. Pam's age plus Tom's age is 65. Twice Pam's age is equal to 130 minus twice Tom's age. How old are they? *infinite solutions*
- 26. The sum of two numbers is 50. Three times the first number minus three times the second number is 30. What are the numbers? 30 *and* 20
- 27. The perimeter of a rectangle is 30 cm. Four times the length of the rectangle is equal to 120 minus four times the width. What are the length and width? *no solution*
- 28. A customer bought six cups of coffee and four bagels and paid \$10. Another customer bought three cups of coffee and two bagels and paid \$15. How much are each cup of coffee and each bagel? *no solution*
- 29. A family went to Six Flags and bought two adult tickets and five child tickets and paid \$160. A second family bought two adult tickets and eight child tickets and paid \$220. How much is each adult ticket and each child ticket? \$20 per child, \$30 per adult
- 30. Jorge bought two T-shirts and four hoodies for the CMS Student Council for \$80. Xavier bought one T-shirt and two hoodies for \$40. How much is each T-shirt and each hoodie? *infinite solutions*