

Provide worked out solutions on separate sheets of loose leaf paper. Show all steps to demonstrate concept mastery.

Linear Equations

$$y = mx + b$$

$$y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Find the slope of the line passing through the given points.

1. $(-3, 5)$ and $(2, 1)$

2. $(1, -4)$ and $(2, 6)$

3. $(-6, 6)$ and $(6, -6)$

4. $(-9, 8)$ and $(-9, 2)$

5. $(-7, 3)$ and $(-2, 3)$

6. $(4, 2)$ and $(18, 4)$

Write an equation for the line described.

7. passing through $(3, 4)$ with slope -3

8. passing through $(-6, 4)$ with slope $\frac{1}{2}$

9. passing through $(5, -1)$ and parallel to $y = 5x + 2$.

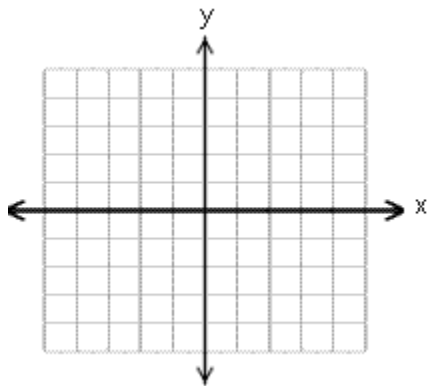
10. passing through $(6, -4)$ and perpendicular to $y = 2x - 1$.

Linear Systems

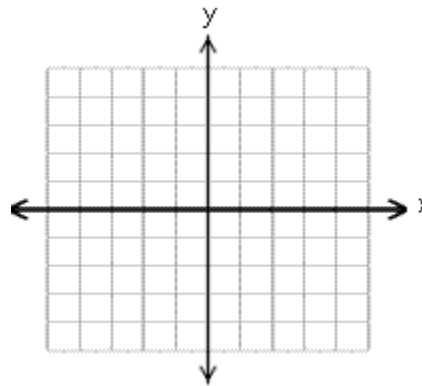
 Solve by Graphing, Linear Combination or Substitution

Solve the linear systems by graphing.

11.
$$\begin{cases} y = 2x - 3 \\ y = -\frac{1}{2}x + 2 \end{cases}$$



12.
$$\begin{cases} -2x + y = 5 \\ y = -x + 2 \end{cases}$$



Solve each system using linear combination.

13.
$$\begin{cases} 5x - 2y = 30 \\ x + 2y = 6 \end{cases}$$

14.
$$\begin{cases} 4x - y = 7 \\ 5x + 3y = 13 \end{cases}$$

15.
$$\begin{cases} 5x - 2y = 8 \\ 2x + 7y = 11 \end{cases}$$

16. Tickets for a benefit concert for a charity sold at \$5.50 for an adult ticket and \$3.25 for a student ticket. If the receipts from the sale of 1800 tickets totaled \$8595, how many adult tickets and how many student tickets were sold?
17. In a certain game, a player can solve easy or hard puzzles. A player earns 30 points for solving an easy puzzle and 60 points for solving a hard puzzle. Tina solved a total of 50 puzzles playing this game, earning 1950 points in all. How many hard puzzles did Tina solve?

Solve each system using substitution.

18.
$$\begin{cases} 4x - 3y = 2 \\ y = -2x - 4 \end{cases}$$

19.
$$\begin{cases} 5x + 6y = 14 \\ y = 4x - 17 \end{cases}$$

20. The length of a rectangle is 4 meters less than twice the width. The perimeter is 28 meters. Find the length and width of the rectangle.

Factoring

Factor each of the following.

21. $x^2 + 12x + 32$

22. $x^2 - 4x - 12$

23. $8n^2 + 14n + 3$

24. $5x^2 - 28x + 15$

25. $10 + 11x - 6x^2$

26. $12n^2 - 17n + 6$

Quadratic Equations

Solve each quadratic equation by factoring.

27. $x^2 + 15x + 50 = 0$

28. $x^2 - x = 6$

29. $m^2 - 8m = 0$

30. $6y = 16 - y^2$

31. $2n^2 + 9n + 7 = 0$

32. $3x^2 = 15 - 4x$

33. $x^3 - 7x^2 + 10x = 0$

Solve each quadratic equation using the Quadratic Formula.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

34. $2y^2 + 3y - 3 = 0$

35. $2x^2 + 13 = 2x$

36. $x^2 - 10x + 14 = 0$

37. $4x^2 + 9x + 3 = 0$

38. $5x^2 + 3x - 1 = 0$

39. $8x^2 + 4x + 5 = 0$

Laws of Exponents

$$a^m \cdot a^n = a^{m+n}$$

$$\frac{a^m}{a^n} = a^{m-n}$$

$$(a^m)^n = a^{m \cdot n}$$

Simplify each of the following.

40. $-5a^4bc^5 \cdot 8a^2b^6c =$

41. $2m^2(4mn^5)^3 =$

42. $\frac{10x^3y^7z^8}{15x^7y^7z^7} =$

43. $\left(\frac{-5c^4}{2d^3}\right)^3 =$

44. $7x^{-3} \cdot 2y^0 \cdot x^{-4} \cdot 4y^2 =$

45. $(2a^{-2}b^3)^{-4} =$

46. $\frac{6c^{-5}d^{-3}}{-8c^4d^{-7}} =$

47. $\left(\frac{-3xy^{-2}}{2w^{-3}}\right)^4 =$

48. $(xy^{-1})^2 =$

Solve each exponential equation.

Example: $3^{4x-3} = 81$ becomes $3^{4x-3} = 3^4$ so $4x - 3 = 4$ then $x = \frac{7}{4}$

Example: $4^{3x} = 8^{x+1}$ becomes $(2^2)^{3x} = (2^3)^{x+1}$ so $2(3x) = 3(x+1)$ then $x = 1$

Solve each.

49. $10^{x-3} = 100^{4x-5}$

50. $25^{x-1} = 125^{4x}$

51. $3^{x-7} = 27^{2x}$

Circles

Find the center and radius length of each circle. Complete the square to re-write each expression in $(x-h)^2 + (y-k)^2 = r^2$ standard form.

52. $x^2 + y^2 - 4x + 6y + 4 = 0$

53. $x^2 + y^2 - 10x - 2y + 10 = 0$

54. $x^2 + y^2 - 4x - 2y - 4 = 0$

55. $x^2 + y^2 - 12x - 24y + 36 = 0$