

**No Graphing Calculators Allowed!**  
**Use Algebraic Notation AND Show All of Your Work**

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1. Simplify:  $9 - 5[8 - (3y - 4)]$
2. Simplify:  $4(6x^2 - 5) - [3(5x^2 - 1) + 7]$

Evaluate using the **ORDER OF OPERATIONS** (show the steps clearly using correct algebraic notation).

3. Evaluate:  $[11 - 4(2 - 3^3)] \div 37$
4. Evaluate:  $10^2 - 100 \div 5^2 \cdot 2 - 3$

Evaluate the following expression for the given value of the variable.

5.  $-2x^2 - 11x$ ;  $x = -3$
6.  $5y^3 - 3y^2 + 7y$ ;  $y = -2$

Solve each equation. State the **solution set**.

7.  $13 - 2r + 2 + 6r - 3r - 2r - 1 = 3 + 2 \cdot 9$
8.  $26 - 8s = 20 - 7s$
9.  $-9x - 2 = 4 - 6x$
10.  $-5 + 2(z + 3) = 5z - 3(z + 1)$
11.  $24 - 7(3y - 2) = 5 - 6(2y - 1)$
12.  $\frac{3x}{5} - \frac{x}{10} = x + \frac{5}{2}$
13. After a 35% reduction, you purchase a television for \$780. What was the television's price before the reduction? (Define a variable, create an equation, solve using algebra, and answer in a sentence.)
14. A rectangular field has a perimeter of 1040 feet. The length is 200 feet more than the width. Find the width and the length of the field. (Draw a diagram of the situation, define a variable, create an equation, solve using algebra, and answer in a sentence.)
15. One angle of a triangle is three times as large as the smallest angle. The measure of the third angle is  $30^\circ$  more than that of the smallest angle. Find the measure of each angle. (Draw a diagram of the situation, define a variable, create an equation, solve using algebra, and answer in a sentence.)

Solve the following inequality, and state the solution set. Graph this solution set on a number line.

16.  $3 - 7x \leq 17$

17.  $2y - 5 > 5y - 11$

18.  $7 - 2(x - 4) \geq 5(1 - 2x)$

Graph by plotting points.

19.  $2x - 3y = -6$

Find the  $x$ - and  $y$ -intercepts, then graph the equation.

20.  $-5x + 3y = 15$

21. Find the **slope** of the line through  $(-14, -4)$  and  $(-2, 4)$ .

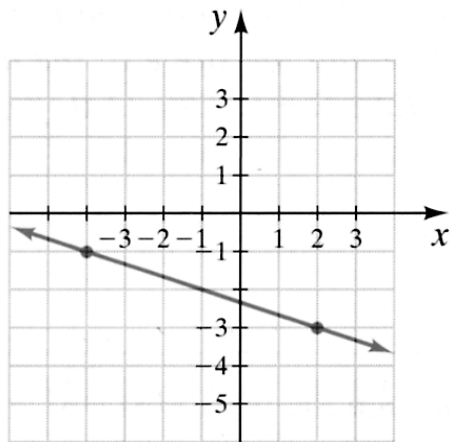
Determine the **slope** and  **$y$ -intercept** of the line represented by the following equation. Graph the line by using the slope and  $y$ -intercept.

22.  $-2x = 5y + 10$

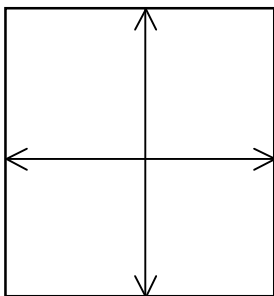
From the graph below, write the equation of the line with the given properties, in **slope-intercept** form.

23. Through  $(-14, -4)$  and  $(-2, 4)$

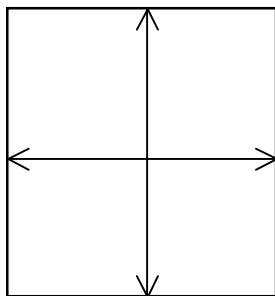
24.



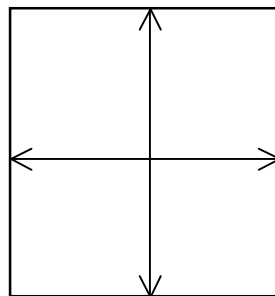
25. Graph examples of lines that show four different types of slopes.



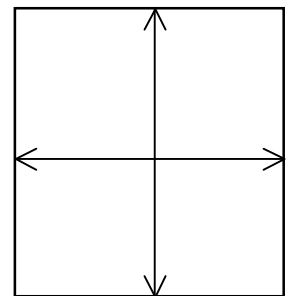
*Positive slope*



*Negative slope*



*Zero slope*



*Undefined Slope*

Solve the following systems. State the **solution set**.

26. 
$$\begin{cases} -2x + y = -1 \\ x - 2y = -4 \end{cases}$$

27. 
$$\begin{cases} -6x + 2y = -2 \\ -3x + y = 2 \end{cases}$$

28. 
$$\begin{cases} 2y = x - 4 \\ 3x - 6y = 12 \end{cases}$$

29. You invest \$20,000 in two accounts paying 7% and 9% annual interest, respectively. If the total interest earned for the year is \$1,550, how much is invested at each rate? (Define two variables, set-up an organizational structure, create a system of equations, solving using one of the algebraic techniques from Chapter 4, and answer in a sentence.)

30. One Kung Pao chicken and two Big Macs provide 2620 calories. Two Kung Pao chickens and one Big Mac provide 3740 calories. Find the caloric content of each item. (Define two variables, create a system of equations, solving using one of the algebraic techniques from Chapter 4, and answer in a sentence.)

31. You invest \$20,000 in two accounts paying 7% and 8% annual interest, respectively. If the total interest earned for the year is \$1,520, how much is invested at each rate? (Define two variables, set-up an organizational structure, create a system of equations, solving using one of the algebraic techniques from Chapter 4, and answer in a sentence.)

32. A candy company needs to mix a 25% fat content chocolate with a 35% fat content chocolate to obtain 40 pounds of a 32% fat content chocolate. How many pounds of each kind of chocolate must be used? (Define two variables, set-up an organizational structure, create a system of equations, solving using one of the algebraic techniques from Chapter 4, and answer in a sentence.)

33. A boat's crew rowed 16 kilometers downstream, with the current, in 2 hours. The return trip upstream, against the current, covered the same distance, but took 4 hours. Find the crew's rowing rate in still water and the rate of the current. (Draw a diagram of the situation, define two variables, set-up an organizational structure, create a system of equations, solving using one of the algebraic techniques from Chapter 4, and answer in a sentence.)

34. Subtract:  $(-8x^4y^3 + 5x^3y^2 - 7y) - (3x^4y^3 - 5x^3y^2 - 8y + 9x)$

35. Subtract:  $(-13x^4 + 8x^2 - 6x) - (-18x^4 - 18x^2 + 7x)$

36. Simplify:  $(-2x^{12})^5$

37. Multiply:  $(4z^5)(-6z^8)(5z^9)$

38. Multiply:  $-6w^4(3w^5 - 2w^3 - 7)$

39. Multiply:  $4ab^4(11a^5b^3 + 9ab)$

40. Multiply:  $(3y - 4)(2y + 5)$

41. Multiply:  $(3x - 1)(5x^2 - 3x + 2)$ .

42. Multiply:  $(6x^4 - 7)(5x^3 - 8)$

43. Multiply:  $\left(3y - \frac{1}{3}\right)^2$

44. Multiply:  $(5x^2 - 3)^2$

45. Simplify:  $\left(\frac{-x^5y^7}{3z}\right)^4$

46. Divide:  $\frac{49y^6 - 28y^4 + 70y^3}{-7y^3}$

47. Divide:  $\frac{2x^2 - 13x + 21}{x - 3}$

48. Simplify:  $\left(\frac{12x^5}{4x^2}\right)^{-4}$

49. Simplify:  $(3a^{-5}b^6)^{-4}$

*Factor each polynomial using the greatest common factor. If there is no common factor other than 1 and the polynomial cannot be factored, so state.*

50.  $18x^3y^2 - 12x^3y + 24x^2y^2$

*Factor by grouping.*

51.  $x^3 + 6x^2 - 2x - 12$

Factor each polynomial completely, or state that the polynomial is prime.

52.  $y^2 + 5y - 24$

53.  $-3w^4 - 54w^3 - 135w^2$

54.  $3r^3 - 9r^2 - 54r$

55.  $48a^4 - 3a^2$

Use factoring to solve each quadratic equation. State your result in a **solution set**.

56.  $3x^2 = 15 - 4x$

57.  $x(3x - 8) = -5$

58.  $(5x + 4)(x - 1) = 2$

59. The length of a rectangular garden is 5 feet greater than the width. The area of the rectangle is 300 square feet. Find the length and the width. (Draw a picture, define a variable, create an equation, solve using algebra, and answer in a sentence.)

60. A model rocket is launched from a height of 80 feet. The formula  $h = -16t^2 + 64t + 80$  describes the rocket's height,  $h$ , in feet,  $t$  seconds after it was launched. How long will it take the rocket to reach the ground? (Create an equation, solve using algebra, and answer in a sentence.)

61. Find all numbers for which  $\frac{7x - 28}{8x - 40}$  is undefined.

62. Find all numbers for which  $\frac{x}{x - 7}$  is undefined.

63. Simplify:  $\frac{x^2 - 1}{x^2 + 2x + 1}$

64. Simplify:  $\frac{x + 2}{x^2 - x - 6}$

65. Simplify:  $\frac{x^2 - 5x + 6}{x^2 - 4} \cdot \frac{x^2 - 1}{x^2 - 2x - 3}$

66. Simplify:  $\frac{3y^2 + 17y + 10}{3y^2 - 22y - 16} \cdot \frac{y^2 - 4y - 32}{y^2 - 8y - 48}$

67. Simplify:  $\frac{4x^2 + 10}{x - 3} \div \frac{6x^2 + 15}{x^2 - 9}$

68. Simplify:  $\frac{y^2 + 5y + 4}{y^2 + 12y + 32} \div \frac{y^2 - 12y + 35}{y^2 + 3y - 40}$

69. Simplify:  $\frac{5x + 1}{x^2 - 9} - \frac{4x - 2}{x^2 - 9}$

70. Simplify:  $\frac{2x + 3}{3x - 6} - \frac{3 - x}{3x - 6}$