To: CE College Algebra (MAT1340) Students for the 2026-27 School year
From: The CE College Algebra Teacher (Mrs. Shofner)

I am SO excited to have you in my class next year and cannot wait to meet you all and your we (SHHS math department) want to make sure that ALL of you start the year off on the right foot. We have compiled some topics that we know students need to be good at coming into the course, so they don't already feel behind. The following topics are things that you SHOULD be able to do well.

- Operations with Fractions
- Rules of exponents**
- Simplifying Radicals Radicals**
- Evaluating Expressions with and without variables**
- Evaluate using function notation**
- Solving multi-step linear equations**
- Solve and graph basic inequalities**
- Operations with Integers (Positive/Negative Numbers)
- Adding and Subtracting Polynomials
- Multiplying Polynomials**
- Factoring binomials and trinomials** (this is HUGE- we do this A LOT!!!)
- Graph and write linear Equations**
- Solving linear systems by graphing
- Solving linear systems by substitution or elimination
- Solving by factoring**
- Solving using the quadratic formula**

Anything that is starred above are things that we have put into this packet. It is HIGHLY recommended that you do this packet throughout the summer, so you can start the year strong. You do not need to do every problem, do enough to be confident and efficient. However, please note that **we will refresh (not reteach) these topics in the first week of school and as needed throughout the semester.** The items that are not starred are not in this packet. If you know you may be weak in one of those areas, we suggest you review it on your own.

Note: The expectation is that you can do ALL of these topics WITHOUT access to a calculator of any kind. All of these answers should be exact (no approximations).

For any of these topics, if you are confused, Khan Academy has a ton of great videos around these topics – just search! Youtube may also be useful, but not all videos are good, so use with caution.

If you have any questions email Mrs. Shofner at nshofner@cherrycreekschools.org - be patient as you may not get a response immediately! Email will only be checked about once a week.

EVALUATING EXPRESSIONS

To evaluate a **numerical expression** involving more than one operation, follow the *order of operations*.

- First do operations that occur within grouping symbols.
- Then evaluate *powers* (expressions with exponents, such as $3^2 = 3 \cdot 3$).
- Then do multiplications and divisions in order from left to right.
- Finally, do additions and subtractions in order from left to right.

EXAMPLES Evaluate the expression.

a. $2 - (4 - 7)^2 \div (-6)$ **b.** $\dfrac{(2 + 4)^2}{2 + 4^2}$

SOLUTION **a.** $2 - (4 - 7)^2 \div (-6) = 2 - (-3)^2 \div (-6) = 2 - 9 \div (-6) = 2 - (-1.5) = 3.5$

b. A fraction bar acts as a grouping symbol. Simplify the numerator and the denominator. Then divide.

$$\frac{(2 + 4)^2}{2 + 4^2} = \frac{6^2}{2 + 16} = \frac{36}{18} = 2$$

To evaluate a **variable expression**, substitute values for the variables, and simplify the resulting numerical expression using the order of operations.

EXAMPLES Evaluate the expression when $x = 3$.

a. $x(2x - 8)$ **b.** $\dfrac{12}{x} + \dfrac{1}{2}x$

SOLUTION **a.** $x(2x - 8) = 3(2 \cdot 3 - 8) = 3(6 - 8) = 3(-2) = -6$

b. $\dfrac{12}{x} + \dfrac{1}{2}x = \dfrac{12}{3} + \dfrac{1}{2} \cdot 3 = 4 + 1.5 = 5.5$

PRACTICE

Evaluate the expression.

1. $8^2 + (-6)^2$ **2.** $-4 \cdot 5 - 8 \div 2$ **3.** $-7 + 2^3 - 9$ **4.** $18 \div [(4 - 7) + 5]$

5. $9(7 - 2)^2$ **6.** $\dfrac{3}{4} \cdot 24 + 4^2 - 1$ **7.** $156 - 3^2 \cdot 5 - 8^2$ **8.** $4.2 \div (0.7 \div 0.1)$

9. $17^2 - 15^2$ **10.** $\dfrac{5 + 7 \cdot 3}{6 + 7}$ **11.** $\dfrac{2 - 9}{8 - 8^2}$ **12.** $[(1 - 7)^2 + 4] \div 8$

Evaluate the expression when $x = -4$ and $y = 3$.

13. $-3x^2$ **14.** $(-3x)^2$ **15.** $\dfrac{x + 2}{x - 2}$ **16.** $\dfrac{1}{2}x^3$

17. $x(x + 7)$ **18.** $20 - \dfrac{16}{x}$ **19.** $x^2 - x + 5$ **20.** $(x + 3)(x - 3)$

21. $xy \div (x + y)$ **22.** $5(2y - x)$ **23.** $-2x^2 + y^2$ **24.** $-2(x + 4y)^2$

THE DISTRIBUTIVE PROPERTY

Here are four forms of the **distributive property**:

$a(b + c) = ab + ac$ and $(b + c)a = ba + ca$

$a(b - c) = ab - ac$ and $(b - c)a = ba - ca$

EXAMPLES

a. $x(x + 4) = x \cdot x + 4x = x^2 + 4x$

b. $-(2a - 3b) = -1(2a - 3b) = -1 \cdot 2a - (-1)(3b) = -2a + 3b$

c. $5 - 3(n - 2) = 5 - (3 \cdot n - 3 \cdot 2) = 5 - 3n - (-6) = 5 - 3n + 6 = 11 - 3n$

When an expression is written as a sum, the parts that are added are the **terms** of the expression. **Like terms** are constant terms or terms that have the same variable raised to the same power. The distributive property allows you to combine like terms that have variables by adding coefficients. An expression is *simplified* if it has no grouping symbols and if all the like terms have been combined.

EXAMPLES

a. $-4x + 7x = (-4 + 7)x = 3x$

b. $2(x + y) - x(4 - y) = 2x + 2y - 4x + xy = (2 - 4)x + 2y + xy = -2x + 2y + xy$

c. $4x^2 + 5x - 7 + 2 - 3x^2 = (4 - 3)x^2 + 5x + (-7 + 2) = x^2 + 5x - 5$

PRACTICE

Use the distributive property to rewrite the expression without parentheses.

1. $2(a + 4)$ **2.** $(2k + 1)7$ **3.** $-(-3x + 2)$ **4.** $(7 - 2z)z$

5. $y(y - 9)$ **6.** $(j - 1)(-3)$ **7.** $\frac{1}{2}(8n - 14)$ **8.** $(3k + 5)(-k)$

9. $4b(b + 2)$ **10.** $(10 + c)d$ **11.** $8x(2x - 9y)$ **12.** $(4t - q)(-3t)$

13. $2r(s + t)$ **14.** $(b + c - 1)6$ **15.** $7(-x^2 + 3x - 2)$ **16.** $-\frac{2}{3}x(6x + 9y - 12)$

Simplify the expression.

17. $-m + 4 + 7m$ **18.** $6x - 9x + x$ **19.** $3z + 6 - 3z - 7$

20. $\frac{1}{5}d + \frac{2}{7}d$ **21.** $18g^3 + 9g^2 + g^3$ **22.** $3.1 + 7.5y - 8y$

23. $6xy + 2x - 3y - 5xy$ **24.** $2.5(4z - 18) + 12$ **25.** $6h - 3h(h + 1)$

26. $3 - (2x - 7)$ **27.** $8 + 3(y - 4)$ **28.** $9k - 2(3k - 5) - 10$

29. $5(r + 1) - (r - 3)$ **30.** $x(2x - 6) + x^2$ **31.** $2(n + 8) + 3n(n - 5)$

MULTIPLYING BINOMIALS

To multiply binomials, use the distributive property. Each term in the first binomial is multiplied by each term in the second binomial. The **FOIL** method can help you remember the pattern of the distributive property. **FOIL** stands for **F**irst, **O**uter, **I**nner, and **L**ast, which is the order in which you multiply terms.

EXAMPLE

$$(x + 1)(2x - 4) = x(2x) + x(-4) + 1(2x) + 1(-4)$$ **Multiply using FOIL.**

$$= 2x^2 - 4x + 2x - 4$$ **Simplify.**

$$= 2x^2 - 2x - 4$$ **Add like terms.**

PRACTICE

Simplify.

1. $(x + 1)(x + 1)$
2. $(4b + 1)(2 + b)$
3. $(3c + 3)(c - 1)$
4. $(t + 3)(2t - 3)$
5. $(a + 5)(4a - 7)$
6. $(5d + 3)(d - 2)$
7. $(2f - 4)(2f + 4)$
8. $(1 - 2g)(g + 3)$
9. $(6h + 3)(h + 1)$

SQUARING BINOMIALS

One way to square a binomial is to use a pattern for the square of a binomial.

Patterns for the Square of a Binomial: $(a + b)^2 = a^2 + 2ab + b^2$

$(a - b)^2 = a^2 - 2ab + b^2$

EXAMPLES

$$(k + 9)^2 = k^2 + 2(k)(9) + 9^2 = k^2 + 18k + 81$$

$$(x - 4)^2 = x^2 - 2(x)(4) + 4^2 = x^2 - 8x + 16$$

If you have trouble remembering the patterns, you can always use the distributive property to find the square of a binomial.

EXAMPLE

$$(r + 3)^2 = (r + 3)(r + 3)$$

$$= r(r + 3) + 3(r + 3)$$ **Distributive property**

$$= r^2 + 3r + 3r + 9$$ **Distributive property**

$$= r^2 + 6r + 9$$ **Combine like terms.**

PRACTICE

Find the product by squaring the binomial.

1. $(x + 2)^2$
2. $(x - 1)^2$
3. $(x + 8)^2$
4. $(10 + x)^2$
5. $(n - 5)^2$
6. $(x - 0.5)^2$
7. $(15 - x)^2$
8. $(y + 12)^2$

PROPERTIES OF EXPONENTS

An expression like 5^3 is called a **power**. The **exponent** 3 represents the number of times the **base** 5 is used as a factor: $5^3 = 5 \cdot 5 \cdot 5$ (3 factors of 5). To simplify expressions involving exponents, you often use properties of exponents. Let a and b be numbers and let m and n be integers.

- **Product of powers property:** $a^m \cdot a^n = a^{m+n}$ — **Example:** $4^2 \cdot 4^5 = 4^{2+5} = 4^7$
- **Power of a power property:** $(a^m)^n = a^{m \cdot n}$ — **Example:** $(x^4)^3 = x^{4 \cdot 3} = x^{12}$
- **Power of a product property:** $(a \cdot b)^m = a^m \cdot b^m$ — **Example:** $(-3k)^4 = (-3)^4 \cdot k^4 = 81k^4$
- If $a \neq 0$, then $a^0 = 1$. — **Example:** $5^0 = 1$
- If $a \neq 0$, then $a^{-n} = \frac{1}{a^n}$. — **Example:** $x^{-5} = \frac{1}{x^5}$
- **Quotient of powers property:** If $a \neq 0$, then $\frac{a^m}{a^n} = a^{m-n}$. — **Example:** $\frac{7^6}{7} = 7^{6-1} = 7^5 = 16{,}807$
- **Power of a quotient property:** If $b \neq 0$, then $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$. — **Example:** $\left(\frac{z}{3}\right)^4 = \frac{z^4}{3^4} = \frac{z^4}{81}$

EXAMPLES Simplify the expression.

a. $(-3xy^2)^3 \cdot y$ b. $\frac{1}{r^7} \cdot r^4$ c. $\frac{1}{x^6} \cdot \left(\frac{x}{2}\right)^6$

SOLUTION

a. $(-3xy^2)^3 \cdot y = (-3)^3 \cdot x^3 \cdot (y^2)^3 \cdot y^1 = -27x^3 \cdot y^{6+1} = -27x^3y^7$

b. $\frac{1}{r^7} \cdot r^4 = \frac{r^4}{r^7} = r^{4-7} = r^{-3} = \frac{1}{r^3}$

c. $\frac{1}{x^6} \cdot \left(\frac{x}{2}\right)^6 = \frac{1}{x^6} \cdot \frac{x^6}{2^6} = \frac{x^6}{64x^6} = \frac{1}{64}$

PRACTICE

Simplify the expression. The simplified expression should have no negative exponents.

1. $\left(-\frac{2}{3}\right)^3$
2. $x^3 \cdot x \cdot x^3$
3. $\left(\frac{1}{2}ab\right)^5$
4. $2n^4 \cdot (3n)^2$
5. $(rst)^0$
6. $\left(8^{-1}\right)^{-3}$
7. $4x^{-3} \cdot y^{-6}$
8. $c \cdot c^{-9}$
9. $4^3 \cdot 4^6$
10. $(3 \cdot a^2 \cdot 6)^2$
11. $\left(\frac{5}{m}\right)^3$
12. $\frac{(-3)^5}{-3^5}$
13. $(2b)^3 \cdot b$
14. $(5x \cdot x^3)^4$
15. $\left(\frac{x^4}{x^3}\right)^2$
16. $c^6 \cdot \frac{1}{c^9}$
17. $\frac{1}{a^{-4}}$
18. $\frac{2x^0}{8y^{-7}}$
19. $\left(2a^{-2}bc^3\right)^{-1}$
20. $\left(\frac{r}{3s}\right)^{-3}$
21. $\left(5ab^3\right)^2 \cdot (-7b^2c)$
22. $w^5 \cdot \left(\frac{7}{w^4}\right)^2$
23. $4y^3z \cdot \left(\frac{y}{2z}\right)^{-3}$
24. $\left(3c^{-4}d^5\right)^{-2} \cdot 12cd^{-4}$

SOLVING LINEAR EQUATIONS (MULTI-STEP)

Solving a linear equation may require several steps. You may need to simplify one or both sides of the equation, use the distributive property, or collect variable terms on one side of the equation.

EXAMPLES Solve the equation.

a. $\frac{1}{5}x + 7 = 3$ **b.** $5 - 2(r + 6) = 1$

SOLUTION

a. $\frac{1}{5}x + 7 = 3$

$\frac{1}{5}x + 7 - 7 = 3 - 7$ **Subtract 7 from each side.**

$\frac{1}{5}x = -4$ **Simplify.**

$5 \cdot \frac{1}{5}x = 5(-4)$ **Multiply by the reciprocal.**

$x = -20$ **Simplify.**

CHECK

$\frac{1}{5}(-20) + 7 = 3$ ✓

b. $5 - 2(r + 6) = 1$

$5 - 2r - 12 = 1$ **Distributive property**

$-2r - 7 = 1$ **Simplify.**

$-2r - 7 + 7 = 1 + 7$ **Add 7 to each side.**

$-2r = 8$ **Simplify.**

$\frac{-2r}{-2} = \frac{8}{-2}$ **Divide each side by −2.**

$r = -4$ **Simplify.**

PRACTICE

Solve the equation.

1. $3y - 4 = 20$
2. $\frac{c}{7} + 2 = 1$
3. $6 - \frac{3a}{2} = -6$
4. $3r - (2r + 1) = 21$
5. $5(z + 3) = 12$
6. $44 = 5g - 8 - g$
7. $75 + 7x = 2x$
8. $14r + 81 = -r$
9. $3n - 1 = 5n - 9$
10. $12r - 5 = 7r$
11. $4 - 6p = 2p - 3$
12. $7(b - 3) = 8b + 2$
13. $60c - 54(c - 2) = 0$
14. $22d - (6 + 2d) = 4$
15. $s - (-4s + 2) = 13$
16. $-\frac{1}{2}(16 - 2h) = 11$
17. $1 + j = 2(2j + 1)$
18. $4x + 2(x - 3) = 0$
19. $\frac{1}{4}y + 27 = 41$
20. $\frac{3 + m}{2} = 5$
21. $\frac{x + (-2)}{2} = -6$
22. $\frac{8 + x}{2} = 10$
23. $2 \cdot 3.14 \cdot r = 157$
24. $\frac{1}{2} \cdot 9 \cdot h = 94.5$
25. $12 \cdot b \cdot 13 = 338$
26. $4(t - 7) + 6 = 30$
27. $7y - 84 = 2y + 61$
28. $85 = \frac{1}{2}(226 - x)$
29. $104 = \frac{1}{2}[(360 - x) - x]$
30. $18(x + 18) = 21^2$
31. $18^2 = 15(x + 15)$
32. $12 - 23c = 7(9 - c)$
33. $2.7(z - 7) + 6 = 2.1(3z + 1)$
34. $7(4h + 1) - 2(2h - 3) = -23$
35. $4(5n + 7) - 3n = 3(4n - 9)$
36. $4.7(2f - 0.5) = -6(1.6f - 8.3f)$

FACTORING (don't forget to ALWAYS look for a GCF first!!!)

Factor each of the following completely.

1) $x^2 + 8x + 7$

2) $x^2 + x - 90$

3) $x^2 + 2x - 24$

4) $x^2 - 13x + 40$

5) $x^2 - x - 56$

6) $x^2 + 16x + 64$

7) $x^2 + 4x - 12$

8) $x^2 - 11x + 10$

9) $x^2 - 13x + 40$

10) $5x^2 + 10x + 20$

11) $2x^2 + 22x + 60$

12) $4x^2 - 4x - 8$

13) $2x^2 + 2x - 4$

14) $2x^2 + 6x - 108$

15) $3x^3 - 21x^2 + 120x$

16) $x^2 - 4$

17) $x^2 - 25$

18) $3x^2 - 2x - 5$

19) $2x^2 + 3x - 9$

20) $5x^2 + 19x + 12$

21) $4x^2 - 15x - 25$

22) $4x^2 - 35x + 49$

23) $4x^2 - 17x + 4$

24) $6x^2 + 25x + 25$

25) $16x^2 + 60x - 100$

26) $15x^2 - 27x - 6$

27) $10x^2 - 36x + 18$

28) $9x^3 + 66x^2 + 21x$

29) $25x^2 - 4$

30) $36x^4 - x^2$

SOLVING $AX^2 + C = 0$

A **quadratic equation** is an equation that can be written in the **standard form** $ax^2 + bx + c = 0$ where $a \neq 0$.

When $b = 0$, the quadratic equation has the form $ax^2 + c = 0$. In this case, you can solve for x. Solving $ax^2 + c = 0$ for x^2 you get $x^2 = \frac{-c}{a}$ and the following rules apply.

- If $\frac{-c}{a} > 0$, then $x^2 = \frac{-c}{a}$ has two solutions, $x = \sqrt{\frac{-c}{a}}$ and $x = -\sqrt{\frac{-c}{a}}$.
- If $\frac{-c}{a} = 0$, then $x^2 = \frac{-c}{a}$ has one solution, $x = 0$.
- If $\frac{-c}{a} < 0$, $x^2 = \frac{-c}{a}$ has no real solution.

EXAMPLES Solve the equation.

a. $3x^2 - 1 = 23$ **b.** $12 - x^2 = 13$ **c.** $4 + 2n^2 = 4$

SOLUTION

a. $3x^2 - 1 = 23$

$3x^2 = 24$

$x^2 = 8$

$x = \pm\sqrt{8}$

$x = \pm 2\sqrt{2}$

b. $12 - x^2 = 13$

$-x^2 = 1$

$x^2 = -1$

no real solution

c. $4 + 2n^2 = 4$

$2n^2 = 0$

$n^2 = 0$

$n = 0$

EXAMPLE Solve $(x + 2)^2 = x^2 + 9$.

SOLUTION

$(x + 2)^2 = x^2 + 9$

$x^2 + 4x + 4 = x^2 + 9$ **See page 798 for help with squaring a binomial.**

$4x = 5$ **The given equation simplifies to a linear equation.**

$x = 1.25$ **Simplify.**

PRACTICE

Solve the equation or write *no solution*. Round solutions to the nearest hundredth.

1. $x^2 = 625$
2. $x^2 = -9$
3. $x^2 + 6 = 11$
4. $4x^2 = 0$
5. $-8 + 3r^2 = 4$
6. $\frac{1}{2}k^2 + 3 = 245$
7. $7a^2 + 25 = -6$
8. $4x^2 - 2 = 1$
9. $(x + 5)^2 = x^2 + 49$
10. $x^2 + 81 = (x + 6)^2$
11. $(x + 1)^2 = 27 + x^2$
12. $(x + 4)^2 = (x - 4)^2 + 96$

SOLVING $AX^2 + BX + C = 0$

You can solve any quadratic equation by using the **quadratic formula**. This formula, which you used in Algebra, states that the solutions of the quadratic equation $ax^2 + bx + c = 0$ are

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \text{ when } a \neq 0 \text{ and } b^2 - 4ac \geq 0.$$

EXAMPLE Solve $x^2 - 4x - 12 = 0$ by using the quadratic formula.

SOLUTION Substitute $a = 1$, $b = -4$, and $c = -12$ in the quadradic formula.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{4 \pm \sqrt{(-4)^2 - 4(1)(-12)}}{2 \cdot 1} = \frac{4 \pm \sqrt{64}}{2}$$

▶ The solutions are $\frac{4 + 8}{2} = 6$ and $\frac{4 - 8}{2} = -2$.

Check your solutions by substituting each solution into the original equation.

$6^2 - 4(6) - 12 = 0$

$36 - 24 - 12 = 0$ ✓

$(-2)^2 - 4(-2) - 12 = 0$

$4 + 8 - 12 = 0$ ✓

EXAMPLE Solve $2x^2 + 6x = 1$ by using the quadratic formula.

SOLUTION

Begin by writing the equation in *standard form*: $2x^2 + 6x - 1 = 0$.

Substitute $a = 2$, $b = 6$, and $c = -1$ in the quadratic formula.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-6 \pm \sqrt{6^2 - 4 \cdot 2(-1)}}{2 \cdot 2} = \frac{-6 \pm \sqrt{44}}{4} = \frac{-6 \pm 2\sqrt{11}}{4} = \frac{-3 \pm \sqrt{11}}{2}$$

▶ The solutions are $\frac{-3 + \sqrt{11}}{2} \approx 0.16$ and $\frac{-3 - \sqrt{11}}{2} \approx -3.16$.

PRACTICE

Use the quadratic formula to solve each equation. Round solutions to the nearest hundredth.

1. $x^2 + 5x + 4 = 0$
2. $x^2 - x - 6 = 0$
3. $x^2 + 6x = 0$
4. $a^2 + 8 = 6a$
5. $z^2 = 9z - 1$
6. $-25 = x^2 + 10x$
7. $2x^2 + 4x + 1 = 0$
8. $4c^2 = 4c - 1$
9. $-8m + 3m^2 = -1$
10. $3x^2 + 6x + 2 = 0$
11. $5y^2 = 1 + 5y$
12. $4x^2 - 3x = 7$

SOLVING INEQUALITIES

You can solve a linear inequality in one variable in much the same way you solve a linear equation in one variable.

EXAMPLES Solve the inequality.

a. $x + 18 > 24$

$x + 18 - 18 > 24 - 18$

$x > 6$

b. $x + (2x - 5) > x + 3$

$3x - 5 > x + 3$	**Simplify.**
$3x - 5 + 5 > x + 3 + 5$	**Add 5 to each side.**
$3x > x + 8$	**Simplify.**
$-x + 3x > -x + x + 8$	**Add $-x$ to each side.**
$2x > 8$	**Combine like terms.**
$\frac{2x}{2} > \frac{8}{2}$	**Divide each side by 2.**
$x > 4$	**Simplify.**

A **solution of an inequality** is a number that produces a true statement when it is substituted for the variable in the inequality.

EXAMPLE Decide whether 3 is a solution of the inequality $3x - 8 < 10$.

SOLUTION

$3(3) - 8 < 10$	**Substitute.**
$1 < 10$	**Simplify.**

So, 3 is a solution of the inequality.

PRACTICE

Solve the inequality. Graph your answer on a number line.

1. $24 + 32 > x$

2. $16 + x > 21$

3. $x + 7.8 > 15.1$

4. $x < 125 + 175$

5. $x + \frac{7}{2} < \frac{11}{2}$

6. $55 < 5 + x$

7. $x + 3x > 2x + 6$

8. $(x + 4) + (x + 6) > 3x - 1$

9. $(2x - 1) + (x + 3) > 18 - x$

Check whether the given number is a solution of the inequality.

10. $m + 12 > 30$; 16

11. $n - 3 < 6$; 2

12. $5 + 2p > 10$; 3

13. $3r - 4 < 0$; 0.5

14. $10s - 2 > 40$; 4

15. $6t - 2 < 4t$; 3

16. $7u + 7 < 38$; 5

17. $8(w - 3) > 95$; 15

18. $6.2x - 3.7 < -14$; -2.2

19. Name three solutions of the inequality $(2x - 3) + (x + 5) > x + 8$. Is 3 a solution? Explain.

Evaluating Functions

Evaluate each function.

1) $h(t) = |t+2| + 3$; Find $h(6)$

2) $g(a) = 3^{3a-2}$; Find $g(1)$

3) $w(t) = -2t + 1$; Find $w(-7)$

4) $g(x) = 3x - 3$; Find $g(-6)$

5) $h(n) = -2n^2 + 4$; Find $h(4)$

6) $h(t) = -2 \cdot 5^{-t-1}$; Find $h(-$

7) $f(x) = x^2 - 3x$; Find $f(-8)$

8) $p(a) = -4^{3a}$; Find $p(-1)$

9) $p(t) = 4t - 5$; Find $p(t-2)$

10) $g(a) = 4a$; Find $g(2a)$

RADICAL EXPRESSIONS

If $a^2 = b$, then a is a **square root** of b. Every positive number has two square roots: a positive square root and a negative square root. For example.

$4^2 = 16$ and $(-4)^2 = 16$, so the square roots of 16 are 4 and -4. We write:

$$\sqrt{16} = 4 \text{ and } -\sqrt{16} = -4.$$

Zero has just one square root: $\sqrt{0} = 0$.

EXAMPLES $11^2 = 121$, so $-\sqrt{121} = -11$ $\qquad \left(\frac{1}{5}\right)^2 = \frac{1}{25}$, so $\sqrt{\frac{1}{25}} = \frac{1}{5}$

$\sqrt{-4}$ is undefined, because the square of every real number is either positive or zero.

$\sqrt{5+4} = \sqrt{9} = 3$. Begin by simplifying an expression under the square root symbol.

When you simplify a radical expression, you will often use the following properties of radicals.

If a and b are positive numbers, then $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$ and $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$.

EXAMPLES Simplify the expression.

a. $\sqrt{56}$ **b.** $\sqrt{6} \cdot \sqrt{15}$ **c.** $\frac{\sqrt{150}}{\sqrt{2}}$ **d.** $\frac{5}{\sqrt{8}}$

SOLUTION

a. $\sqrt{56} = \sqrt{4} \cdot \sqrt{14} = 2\sqrt{14}$

b. $\sqrt{6} \cdot \sqrt{15} = \sqrt{6 \cdot 15} = \sqrt{90} = \sqrt{9 \cdot 10} = \sqrt{9} \cdot \sqrt{10} = 3\sqrt{10}$

c. $\frac{\sqrt{150}}{\sqrt{2}} = \sqrt{\frac{150}{2}} = \sqrt{75} = \sqrt{25 \cdot 3} = \sqrt{25} \cdot \sqrt{3} = 5\sqrt{3}$

d. $\frac{5}{\sqrt{8}} = \frac{5}{2\sqrt{2}} = \frac{5}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{5\sqrt{2}}{4}$ **Do not leave a square root in a denominator.**

PRACTICE

Find all square roots of the number or write *no square roots*. Check the results by squaring each root.

1. 64 **2.** -36 **3.** $\frac{49}{81}$ **4.** $\frac{7}{100}$ **5.** 0.09

Simplify the expression. Give the exact value in simplified form.

6. $\sqrt{36+64}$ **7.** $\sqrt{4+9}$ **8.** $\sqrt{16+16}$ **9.** $\sqrt{(-1)^2+7^2}$

Simplify the expression. Give the exact value in simplified form.

10. $-\sqrt{0}$ **11.** $-\sqrt{196}$ **12.** $\sqrt{54}$ **13.** $\sqrt{60}$

14. $\sqrt{7} \cdot \sqrt{3}$ **15.** $\sqrt{12} \cdot \sqrt{6}$ **16.** $\sqrt{10} \cdot \sqrt{15}$ **17.** $\sqrt{120 \cdot 105}$

18. $\frac{\sqrt{147}}{\sqrt{3}}$ **19.** $\frac{\sqrt{20}}{\sqrt{500}}$ **20.** $\frac{\sqrt{48}}{\sqrt{6}}$ **21.** $\frac{\sqrt{6}}{\sqrt{96}}$

22. $\frac{4}{\sqrt{3}}$ **23.** $\frac{6}{\sqrt{2}}$ **24.** $\frac{5}{\sqrt{20}}$ **25.** $\frac{4}{\sqrt{27}}$

SLOPE-INTERCEPT FORM

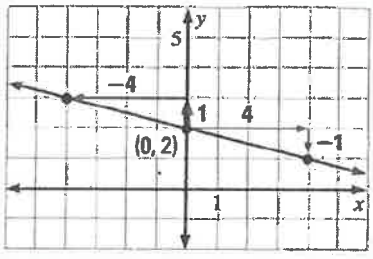
Another way to draw the graph of a linear equation is to use the slope and the y-intercept. Recall that the slope of a nonvertical line is $m = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x}$.

The linear equation $y = mx + b$ is written in **slope-intercept form.** The slope of the line is m and the y-intercept is b.

EXAMPLE Graph the equation $\frac{1}{2}x + 2y = 4$.

SOLUTION To graph the equation $\frac{1}{2}x + 2y = 4$, write the equation in slope-intercept form:

$$2y = -\frac{1}{2}x + 4; y = -\frac{1}{4}x + 2.$$



The slope m is $-\frac{1}{4}$, and the y-intercept b is 2.

Plot the point (0, 2).

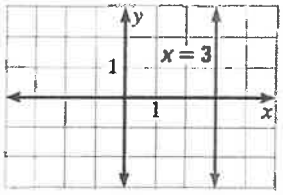
Draw a *slope triangle* to locate a second point on the line:

$$m = -\frac{1}{4} = \frac{\text{rise}}{\text{run}}.$$

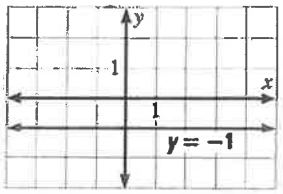
Draw a line through the two points.

EXAMPLES Graph $x = 3$ and $y = -1$.

SOLUTION



The graph of $x = 3$ is a vertical line.



The graph of $y = -1$ is a horizontal line.

PRACTICE

Use the slope and the *y*-intercept to graph the equation.

1. $y = \frac{1}{2}x + 4$	**2.** $y = \frac{1}{2}x - 4$	**3.** $y = -\frac{1}{2}x - 4$	**4.** $y = -\frac{1}{2}x + 4$
5. $x - y - 3 = 0$	**6.** $2x + 3y = -9$	**7.** $3x - y = 0$	**8.** $x + 2y = 5$
9. $-4x = 8$	**10.** $0.25y = 3$	**11.** $-y - 3x = 4$	**12.** $2x = 6 - 3y$

13. Graph the equation $x = -2$. Explain why the graph has no slope and no y-intercept.

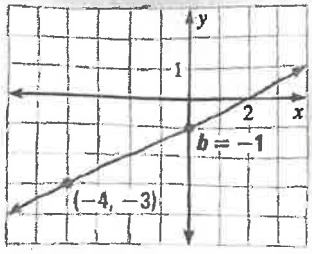
14. Graph the equation $y = 3$. Find the slope of the graph. Name three different ordered pairs that are solutions of the graph.

WRITING LINEAR EQUATIONS

The slope of a nonvertical line is $m = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x}$.

Given the slope and the y-intercept of a line, the slope and a point on a line, or two points on a line, you can use the slope-intercept form to write an equation of the line.

EXAMPLE Write an equation of a line that has a slope of $\frac{1}{2}$ and passes through the point $(-4, -3)$.



SOLUTION

$y = mx + b$ **Write slope formula.**

$-3 = \frac{1}{2}(-4) + b$ **Substitute.**

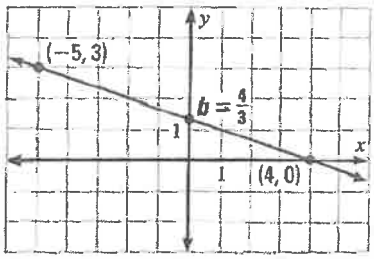
$-1 = b$ **Simplify.**

▶ So, $m = \frac{1}{2}$ and $b = -1$, and an equation of the line is $y = \frac{1}{2}x - 1$.

EXAMPLE Write an equation of a line that passes through the points $(4, 0)$ and $(-5, 3)$.

SOLUTION First find the slope of the line.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - 0}{-5 - 4} = -\frac{1}{3}$$



Then substitute the slope and the coordinates of either point into the slope-intercept formula to find the y-intercept. Let $m = -\frac{1}{3}$, $x = 4$, and $y = 0$.

$0 = -\frac{1}{3} \cdot 4 + b$ **Substitute.**

$b = \frac{4}{3}$ **Simplify.**

▶ An equation of the line is $y = -\frac{1}{3}x + \frac{4}{3}$.

PRACTICE

Write an equation in slope-intercept form of the line that passes through the given point and has the given slope.

1. $(0, -4)$, $m = 1$
2. $(0, 8)$, $m = -3$
3. $(0, -0.75)$, $m = 2.5$
4. $(0, 1.6)$, $m = 0$
5. $(0, 0)$, $m = 0.7$
6. $(0, -24)$, $m = 50$
7. $(1, -5)$, $m = 2$
8. $(3, 0)$, $m = -4$
9. $(-6, -6)$, $m = 12$
10. $(-9, 7)$, $m = -1$
11. $(3, -11)$, $m = 0$
12. $(0.5, -1.5)$, $m = 2$

Write an equation in slope-intercept form of the line that passes through the given points.

13. $(1, 3)$, $(7, 4)$
14. $(0, -3)$, $(-5, 0)$
15. $(-6, -7)$, $(-5, 1)$
16. $(4, 2)$, $(7, -4)$
17. $(2, 0)$, $(-6, -5)$
18. $(11, -1)$, $(-1, -7)$
19. $(-5, 4)$, $(2, -3)$
20. $(4, -9)$, $(8, -9)$
21. $(1.4, 2.7)$, $(3.9, 1.1)$
22. $(0, 11)$, $(16, 87)$
23. $(0.5, 2)$, $(-1.25, 0.5)$
24. $(58, 20)$, $(80, 108)$

ANSWER KEY

EVALUATING EXPRESSIONS (pg 2)

Evaluate the expression.

1. $8^2 + (-6)^2$ 100
2. $-4 \cdot 5 - 8 \div 2$ −24
3. $-7 + 2^3 - 9$ −8
4. $18 \div [(4 - 7) + 5]$ 9
5. $9(7 - 2)^2$ 225
6. $\frac{3}{4} \cdot 24 + 4^2 - 1$ 33
7. $156 - 3^2 \cdot 5 - 8^2$ 47
8. $4.2 \div (0.7 \div 0.1)$ 0.6
9. $17^2 - 15^2$ 64
10. $\frac{5 + 7 \cdot 3}{6 + 7}$ 2
11. $\frac{2 - 9}{8 - 8^2}$ $\frac{1}{8}$
12. $[(1 - 7)^2 + 4] \div 8$ 5

Evaluate the expression when $x = -4$ and $y = 3$.

13. $-3x^2$ −48
14. $(-3x)^2$ 144
15. $\frac{x + 2}{x - 2}$ $\frac{1}{3}$
16. $\frac{1}{2}x^3$ −32
17. $x(x + 7)$ −12
18. $20 - \frac{16}{x}$ 24
19. $x^2 - x + 5$ 25
20. $(x + 3)(x - 3)$ 7
21. $xy \div (x + y)$ 12
22. $5(2y - x)$ 50
23. $-2x^2 + y^2$ −23
24. $-2(x + 4y)^2$ −128

THE DISTIBUTIVE PROPERTY (pg 3)

Use the distributive property to rewrite the expression without parentheses.

1. $2(a + 4)$ $2a + 8$
2. $(2k + 1)7$ $14k + 7$
3. $-(-3x + 2)$ $3x - 2$
4. $(7 - 2z)z$ $7z - 2z^2$
5. $y(y - 9)$ $y^2 - 9y$
6. $(j - 1)(-3)$ $-3j + 3$
7. $\frac{1}{2}(8n - 14)$ $4n - 7$
8. $(3k + 5)(-k)$ $-3k^2 - 5k$
9. $4b(b + 2)$ $4b^2 + 8b$
10. $(10 + c)d$ $10d + cd$
11. $8x(2x - 9y)$ $16x^2 - 72xy$
12. $(4t - q)(-3t)$ $-12t^2 + 3tq$
13. $2r(s + t)$ $2rs + 2rt$
14. $(b + c - 1)6$ $6b + 6c - 6$
15. $7(-x^2 + 3x - 2)$ $-7x^2 + 21x - 14$
16. $-\frac{2}{3}x(6x + 9y - 12)$ $-4x^2 - 6xy + 8$

Simplify the expression.

17. $-m + 4 + 7m$ $6m + 4$
18. $6x - 9x + x$ $-2x$
19. $3z + 6 - 3z - 7$ -1
20. $\frac{1}{5}d + \frac{2}{7}d$ $\frac{17}{35}d$
21. $18g^3 + 9g^2 + g^3$ $19g^3 + 9g^2$
22. $3.1 + 7.5y - 8y$ $3.1 - 0.5y$
23. $6xy + 2x - 3y - 5xy$ $xy + 2x - 3y$
24. $2.5(4z - 18) + 12$ $10z - 33$
25. $6h - 3h(h + 1)$ $3h - 3h^2$
26. $3 - (2x - 7)$ $10 - 2x$
27. $8 + 3(y - 4)$ $3y - 4$
28. $9k - 2(3k - 5) - 10$ $3k$
29. $5(r + 1) - (r - 3)$ $4r + 8$
30. $x(2x - 6) + x^2$ $3x^2 - 6x$
31. $2(n + 8) + 3n(n - 5)$ $3n^2 - 13n + 16$

MULTIPLYING BINOMIALS (pg 4)

Simplify.

1. $(x + 1)(x + 1)$ $x^2 + 2x + 1$
2. $(4b + 1)(2 + b)$ $4b^2 + 9b + 2$
3. $(3c + 3)(c - 1)$ $3c^2 - 3$
4. $(t + 3)(2t - 3)$ $2t^2 + 3t - 9$
5. $(a + 5)(4a - 7)$ $4a^2 + 13a - 35$
6. $(5d + 3)(d - 2)$ $5d^2 - 7d - 6$
7. $(2f - 4)(2f + 4)$ $4f^2 - 16$
8. $(1 - 2g)(g + 3)$ $-2g^2 - 5g + 3$
9. $(6h + 3)(h + 1)$ $6h^2 + 9h + 3$

SQUARING BINOMIALS (pg 4)

Find the product by squaring the binomial.

1. $(x + 2)^2$ $x^2 + 4x + 4$
2. $(x - 1)^2$ $x^2 - 2x + 1$
3. $(x + 8)^2$ $x^2 + 16x + 64$
4. $(10 + x)^2$ $100 + 20x + x^2$, or $x^2 + 20x + 100$
5. $(n - 5)^2$ $n^2 - 10n + 25$
6. $(x - 0.5)^2$ $x^2 - x + 0.25$
7. $(15 - x)^2$ $225 - 30x + x^2$, or $x^2 - 30x + 225$
8. $(y + 12)^2$ $y^2 + 24y + 144$

PROPERTIES OF EXPONENTS (pg 5)

Simplify the expression. The simplified expression should have no negative exponents.

1. $\left(-\frac{2}{3}\right)^3$ $-\frac{8}{27}$
2. $x^3 \cdot x \cdot x^3$ x^7
3. $\left(\frac{1}{2}ab\right)^5$ $\frac{1}{32}a^5b^5$
4. $2n^4 \cdot (3n)^2$ $18n^6$
5. $(rst)^0$ 1
6. $\left(8^{-1}\right)^{-3}$ 512
7. $4x^{-3} \cdot y^{-6}$ $\frac{4}{x^3y^6}$
8. $c \cdot c^{-9}$ $\frac{1}{c^8}$
9. $4^3 \cdot 4^6$ 262,144
10. $(3 \cdot a^2 \cdot 6)^2$ $324a^4$
11. $\left(\frac{5}{m}\right)^3$ $\frac{125}{m^3}$
12. $\frac{(-3)^5}{-3^5}$ 1
13. $(2b)^3 \cdot b$ $8b^4$
14. $(5x \cdot x^3)^4$ $625x^{16}$
15. $\left(\frac{x^4}{x^3}\right)^2$ x^2
16. $c^6 \cdot \frac{1}{c^9}$ $\frac{1}{c^3}$
17. $\frac{1}{a^{-4}}$ a^4
18. $\frac{2x^0}{8y^{-7}}$ $\frac{y^7}{4}$
19. $\left(2a^{-2}bc^3\right)^{-1}$ $\frac{a^2}{2bc^3}$
20. $\left(\frac{r}{3s}\right)^{-3}$ $\frac{27s^3}{r^3}$
21. $\left(5ab^3\right)^2 \cdot (-7b^2c)$ $-175a^2b^8c$
22. $w^5 \cdot \left(\frac{7}{w^4}\right)^2$ $\frac{49}{w^3}$
23. $4y^3z \cdot \left(\frac{y}{2z}\right)^{-3}$ $32z^4$
24. $\left(3c^{-4}d^5\right)^{-2} \cdot 12cd^{-4}$ $\frac{4c^9}{3d^{14}}$

SOLVING LINEAR EQUATIONS (MULTI-STEP) (pg 6)

Solve the equation.

1. $3y - 4 = 20$ 8
2. $\frac{c}{7} + 2 = 1$ −7
3. $6 - \frac{3a}{2} = -6$ 8
4. $3r - (2r + 1) = 21$ 22
5. $5(z + 3) = 12$ −0.6, or $-\frac{3}{5}$
6. $44 = 5g - 8 - g$ 13
7. $75 + 7x = 2x$ −15
8. $14r + 81 = -r$ −5.4, or $-\frac{27}{5}$
9. $3n - 1 = 5n - 9$ 4
10. $12r - 5 = 7r$ 1
11. $4 - 6p = 2p - 3$ $\frac{7}{8}$
12. $7(b - 3) = 8b + 2$ −23
13. $60c - 54(c - 2) = 0$ −18
14. $22d - (6 + 2d) = 4$ $\frac{1}{2}$
15. $s - (-4s + 2) = 13$ 3
16. $-\frac{1}{2}(16 - 2h) = 11$ 19
17. $1 + j = 2(2j + 1)$ $-\frac{1}{3}$
18. $4x + 2(x - 3) = 0$ 1
19. $\frac{1}{4}y + 27 = 41$ 56
20. $\frac{3 + m}{2} = 5$ 7
21. $\frac{x + (-2)}{2} = -6$ −10
22. $\frac{8 + x}{2} = 10$ 12
23. $2 \cdot 3.14 \cdot r = 157$ 25
24. $\frac{1}{2} \cdot 9 \cdot h = 94.5$ 21
25. $12 \cdot b \cdot 13 = 338$ $\frac{13}{6}$
26. $4(t - 7) + 6 = 30$ 13
27. $7y - 84 = 2y + 61$ 29
28. $85 = \frac{1}{2}(226 - x)$ 56
29. $104 = \frac{1}{2}[(360 - x) - x]$ 76
30. $18(x + 18) = 21^2$ 6.5
31. $18^2 = 15(x + 15)$ 6.6
32. $12 - 23c = 7(9 - c)$ $-\frac{51}{16}$
33. $2.7(z - 7) + 6 = 2.1(3z + 1)$ $-\frac{25}{6}$
34. $7(4h + 1) - 2(2h - 3) = -23$ −1.5
35. $4(5n + 7) - 3n = 3(4n - 9)$ −11
36. $4.7(2f - 0.5) = -6(1.6f - 8.3f)$ $-\frac{47}{616}$

FACTORING (pg 7-8)

FACTORING (don't forget to ALWAYS look for a GCF first!!!)

Factor each of the following completely.

1) $x^2 + 8x + 7$

$(x+7)(x+1)$

2) $x^2 + x - 90$

$(x-9)(x+10)$

3) $x^2 + 2x - 24$

$(x+6)(x-4)$

4) $x^2 - 13x + 40$

$(x-5)(x-8)$

5) $x^2 - x - 56$

$(x+7)(x-8)$

6) $x^2 + 16x + 64$

$(x+8)^2$

7) $x^2 + 4x - 12$

$(x-2)(x+6)$

8) $x^2 - 11x + 10$

$(x-10)(x-1)$

9) $x^2 - 13x + 40$

$(x-5)(x-8)$

10) $5x^2 + 10x + 20$

$5(x^2+2x+4)$

11) $2x^2 + 22x + 60$

$2(x+6)(x+5)$

12) $4x^2 - 4x - 8$

$4(x-2)(x+1)$

13) $2x^2 + 2x - 4$

$2(x-1)(x+2)$

14) $2x^2 + 6x - 108$

$2(x-6)(x+9)$

15) $3x^3 - 21x^2 + 120x$

$3x(x^2-7x+40)$

16) $x^2 - 4$

$(x+2)(x-2)$

17) $x^2 - 25$

$(x+5)(x-5)$

18) $3x^2 - 2x - 5$

$(3x-5)(x+1)$

19) $2x^2 + 3x - 9$

$(2x-3)(x+3)$

20) $5x^2 + 19x + 12$

$(5x+4)(x+3)$

21) $4x^2 - 15x - 25$

$(4x+5)(x-5)$

22) $4x^2 - 35x + 49$

$(4x-7)(x-7)$

23) $4x^2 - 17x + 4$

$(4x-1)(x-4)$

24) $6x^2 + 25x + 25$

$(2x+5)(3x+5)$

25) $16x^2 + 60x - 100$

$4(4x-5)(x+5)$

26) $15x^2 - 27x - 6$

$3(5x+1)(x-2)$

27) $10x^2 - 36x + 18$

$2(5x-3)(x-3)$

28) $9x^3 + 66x^2 + 21x$

$3x(3x+1)(x+7)$

29) $25x^2 - 4$

$(5x+2)(5x-2)$

30) $36x^4 - x^2$

$x^2(6x+1)(6x-1)$

SOLVING $AX^2 + C = 0$ (pg 9)

Solve the equation or write *no solution*. Round solutions to the nearest hundredth.

1. $x^2 = 625$ 25, −25
2. $x^2 = -9$ no solution
3. $x^2 + 6 = 11$ $\sqrt{5} \approx 2.24, -\sqrt{5} \approx -2.24$
4. $4x^2 = 0$ 0
5. $-8 + 3r^2 = 4$ 2, −2
6. $\frac{1}{2}k^2 + 3 = 245$ 22, −22
7. $7a^2 + 25 = -6$ no solution
8. $4x^2 - 2 = 1$ $\frac{\sqrt{3}}{2} \approx 0.87, -\frac{\sqrt{3}}{2} \approx -0.87$
9. $(x + 5)^2 = x^2 + 49$ 2.4
10. $x^2 + 81 = (x + 6)^2$ 3.75
11. $(x + 1)^2 = 27 + x^2$ 13
12. $(x + 4)^2 = (x - 4)^2 + 96$ 6

SOLVING $AX^2 + BX + C = 0$ (pg 10)

Use the quadratic formula to solve each equation. Round solutions to the nearest hundredth.

1. $x^2 + 5x + 4 = 0$ −4, −1
2. $x^2 - x - 6 = 0$ 3, −2
3. $x^2 + 6x = 0$ 0, −6
4. $a^2 + 8 = 6a$ 4, 2
5. $z^2 = 9z - 1$ See margin.
6. $-25 = x^2 + 10x$ −5
7. $2x^2 + 4x + 1 = 0$ See margin.
8. $4c^2 = 4c - 1$ 0.5
9. $-8m + 3m^2 = -1$ See margin.
10. $3x^2 + 6x + 2 = 0$ See margin.
11. $5y^2 = 1 + 5y$ See margin.
12. $4x^2 - 3x = 7$ 1.75, −1
13. Solve the quadratic equation $x^2 - 3x + 2 = 0$. Then graph the function $y = x^2 - 3x + 2$ in a coordinate plane. Describe the relationship between the solutions of the quadratic equation and the x-intercepts of the graph. 1, 2; See margin for graph. The solutions of the quadratic equation are the same as the x-intercepts of the graph.

SOLVING INEQUALITIES (pg 11)

olve the inequality.

1. $24 + 32 > x$ $x < 56$
2. $16 + x > 21$ $x > 5$
3. $x + 7.8 > 15.1$ $x > 7.3$
4. $x < 125 + 175$ $x < 300$
5. $x + \frac{7}{2} < \frac{11}{2}$ $x < 2$
6. $55 < 5 + x$ $x > 50$
7. $x + 3x > 2x + 6$ $x > 3$
8. $(x + 4) + (x + 6) > 3x - 1$ $x < 11$
9. $(2x - 1) + (x + 3) > 18 - x$ $x > 4$

heck whether the given number is a solution of the inequality.

10. $m + 12 > 30$; 16 no
11. $n - 3 < 6$; 2 yes
12. $5 + 2p > 10$; 3 yes
13. $3r - 4 < 0$; 0.5 yes
14. $10s - 2 > 40$; 4 no
15. $6t - 2 < 4t$; 3 no
16. $7u + 7 < 38$; 5 no
17. $8(w - 3) > 95$; 15 yes
18. $6.2x - 3.7 < -14$; −2.2 yes

Name three solutions of the inequality $(2x - 3) + (x + 5) > x + 8$. Is 3 a solution? Explain. Examples: 4, 4.5, and 10. No; when $x = 3$, $(2x - 3) + (x + 5) = x + 8$.

EVALUATING FUNCTIONS (pg 12)

Evaluate each function.

1) $h(t) = |t+2| + 3$; Find $h(6)$

11

2) $g(a) = 3^{3a-2}$; Find $g(1)$

3

3) $w(t) = -2t + 1$; Find $w(-7)$

15

4) $g(x) = 3x - 3$; Find $g(-6)$

-21

5) $h(n) = -2n^2 + 4$; Find $h(4)$

-28

6) $h(t) = -2 \cdot 5^{-t-1}$; Find $h(-2)$

-10

7) $f(x) = x^2 - 3x$; Find $f(-8)$

88

8) $p(a) = -4^{3a}$; Find $p(-1)$

$-\frac{1}{64}$

9) $p(t) = 4t - 5$; Find $p(t-2)$

$4t - 13$

10) $g(a) = 4a$; Find $g(2a)$

$8a$

RADICAL EXPRESSIONS (pg 13)

Find all square roots of the number or write *no square roots*. Check the results by squaring each root.

1. 64 8 and -8 2. -36 no square roots 3. $\frac{49}{81}$ $\frac{7}{9}$ and $-\frac{7}{9}$ 4. $\frac{7}{100}$ $\frac{\sqrt{7}}{10}$ and $-\frac{\sqrt{7}}{10}$ 5. 0.09 0.3 and -0.3

Simplify the expression. Give the exact value in simplified form.

6. $\sqrt{36+64}$ 10 7. $\sqrt{4+9}$ $\sqrt{13} \approx 3.61$ 8. $\sqrt{16+16}$ $4\sqrt{2} \approx 5.66$ 9. $\sqrt{(-1)^2+7^2}$ $5\sqrt{2} \approx 7.07$

Simplify the expression. Give the exact value in simplified form.

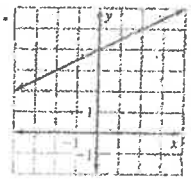
0. $-\sqrt{0}$ 0 11. $-\sqrt{196}$ -14 12. $\sqrt{54}$ $3\sqrt{6} \approx 7.35$ 13. $\sqrt{60}$ $2\sqrt{15} \approx 7.75$

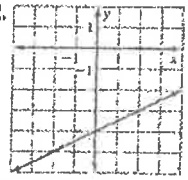
4. $\sqrt{7} \cdot \sqrt{3}$ $\sqrt{21} \approx 4.58$ 15. $\sqrt{12} \cdot \sqrt{6}$ $6\sqrt{2} \approx 8.49$ 16. $\sqrt{10} \cdot \sqrt{15}$ $5\sqrt{6} \approx 12.25$ 17. $\sqrt{120 \cdot 105}$ $30\sqrt{14} \approx 112.25$

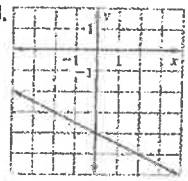
8. $\frac{\sqrt{147}}{\sqrt{3}}$ 7 19. $\frac{\sqrt{20}}{\sqrt{500}}$ $\frac{1}{5} = 0.2$ 20. $\frac{\sqrt{48}}{\sqrt{6}}$ $2\sqrt{2} \approx 2.83$ 21. $\frac{\sqrt{6}}{\sqrt{96}}$ $\frac{1}{4} = 0.25$

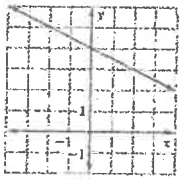
2. $\frac{4}{\sqrt{3}}$ $\frac{4\sqrt{3}}{3} \approx 2.31$ 23. $\frac{6}{\sqrt{2}}$ $3\sqrt{2} \approx 4.24$ 24. $\frac{5}{\sqrt{20}}$ $\frac{\sqrt{5}}{2} \approx 1.12$ 25. $\frac{4}{\sqrt{27}}$ $\frac{4\sqrt{3}}{9} \approx 0.77$

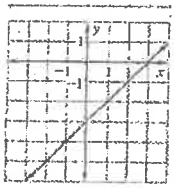
SLOPE-INTERCEPT FORM (pg 15)

1. 

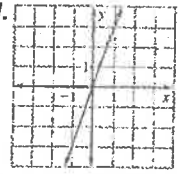
2. 

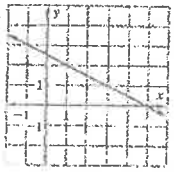
3. 

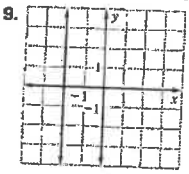
4. 

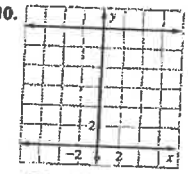
5. 

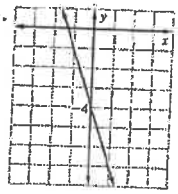
6. 

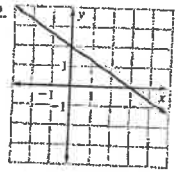
7. 

8. 

9. 

10. 

11. 

12. 

13. The graph has no slope because a vertical line has the same x-coordinate for every point on the line. If you try to evaluate the slope using any two points, you get zero in the denominator, and division by zero is undefined. The graph has no y-intercept because it does not intersect the y-axis.



14. 

WRITING LINEAR EQUATIONS (pg 16)

1. $y = x - 4$
2. $y = -3x + 8$
3. $y = \frac{5}{2}x - \frac{3}{4}$
4. $y = 1.6$
5. $y = 0.7x$
6. $y = 50x - 24$
7. $y = 2x - 7$
8. $y = -4x + 12$
9. $y = \frac{2}{3}x - 2$
10. $y = -x - 2$
11. $y = -11$
12. $y = 2x - \frac{5}{2}$
13. $y = \frac{1}{6}x + \frac{17}{6}$
14. $y = -\frac{3}{5}x - 3$
15. $y = 8x + 41$
16. $y = -2x + 10$
17. $y = \frac{5}{8}x - \frac{5}{4}$
18. $y = \frac{1}{2}x - \frac{13}{2}$
19. $y = -x - 1$
20. $y = -9$
21. $y = -0.64x + 3.596$
22. $y = 4.75x + 11$
23. $y = \frac{6}{7}x + \frac{11}{7}$
24. $y = 4x - 212$