Variables and Expressions

Write a verbal expression for each algebraic expression.

1. $9a^2$

2. $c + 2d$

3. $2b^2$

4. $p^4 + 6r$

Write an algebraic expression for each verbal expression.

5. the sum of a number and 10

6. the product of 18 and q

7. 8 increased by three times a number

8. the product of 2 and the second power of y

Order of Operations

Evaluate each expression.

1. $(5 + 4) \cdot 7$

2. $(3 + 5) \cdot 5 + 1$

3. $30 - 5 \cdot 4 + 2$

4. $14 \div 7 \cdot 5 - 3^2$

5. $5 + [30 - (6 - 1)^2]$

Evaluate each expression if $x = 6$, $y = 8$, and $z = 3$.

6. $xy + z$

7. $2x + 3y - z$

8. $5z + (y - x)$

9. $x^2 + y^2 - 10z$

10. $\dfrac{y + xz}{2}$

Properties of Numbers

Evaluate each expression. Name the property used in each step.

1. $7(16 \div 4^2)$

2. $2[5 - (15 \div 3)]$

3. $4 - 3[7 - (2 \cdot 3)]$

4. $4[8 - (4 \cdot 2)] + 1$

5. $6 + 9[10 - 2(2 + 3)]$

6. $2(6 \div 3 - 1) \cdot \frac{1}{2}$

7. $16 + 8 + 14 + 12$

8. $36 + 23 + 14 + 7$

The Distributive Property

Use the Distributive Property to rewrite each expression. Then evaluate.

  1. $4(3 + 5)$

  2. $5(7 - 4)$

  3. $5 \cdot 89$

  4. $15 \cdot 104$

Use the Distributive Property to rewrite each expression. Then simplify.

  5. $(a + 7)2$

6. $3(m + n)$

Simplify each expression. If not possible, write *simplified*.

7. $2x + 8x$

8. $2x^2 + 6x^2$

9. $3y^2 - 2y$

10. $4(2b - b)$

Write an algebraic expression for each verbal expression. Then simplify, indicating the properties used.

11. The product of 9 and t squared, increased by the sum of the square of t and 2

Equations

Find the solution of each equation if the replacement sets are a = {4, 5, 6, 7, 8} and b = {9, 10, 11, 12, 13}.

1. $5a - 9 = 26$

2. $7a + 21 = 56$

3. $4b - 12 = 28$

Find the solution of each equation using the given replacement set.

4. $\frac{1}{2} + x = \frac{5}{4}; \left\{\frac{1}{2}, \frac{3}{4}, 1, \frac{5}{4}\right\}$

5. $\frac{1}{4}(x + 2) = \frac{5}{6}; \left\{\frac{2}{3}, \frac{3}{4}, \frac{5}{4}, \frac{4}{3}\right\}$

Solve each equation.

6. $10.4 - 6.8 = x$

**7.** $\frac{46 - 15}{3 + 28} = a$

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

9. SHOPPING ONLINE Jennifer is purchasing CDs and a new CD player from an online store. She pays $10 for each CD, as well as $50 for the CD player. Write and solve an equation to find the total amount Jennifer spent if she buys 4 CDs and a CD player from the store.

Relations

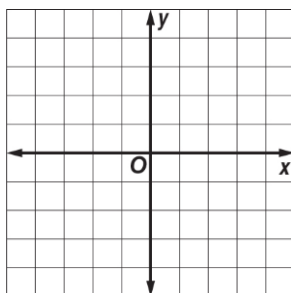**Express each relation as a table, a graph, and a mapping. Then determine the domain and range.**
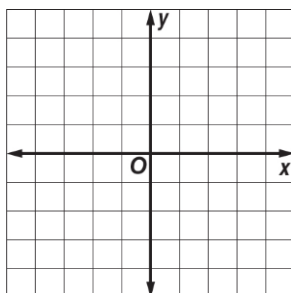
1. {(−1, −1), (1, 1), (2, 1), (3, 2)}

x	y
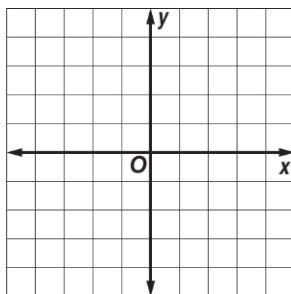
2. {(0, 4), (− 4, − 4), (−2, 3), (4, 0)}

x	y

3. {(3, −2), (1, 0), (−2, 4), (3, 1)}

x	y

Identify the independent and dependent variables for each relation.

4. The more hours Maribel works at her job, the larger her paycheck becomes.

5. Increasing the price of an item decreases the amount of people willing to buy it.

Writing Equations

Translate each sentence into an equation.

  1. Two added to three times a number m is the same as 18.

  2. Seven less than the sum of p and t is as much as 6.

  3. Four times the sum of f and g is identical to six times g.

Translate each sentence into a formula.

  4. The area A of a square is the length of a side l squared.

  5. The area A of a circle is pi times the radius r squared.

Translate each equation into a sentence.

  6. $g + 10 = 3g$

  7. $4(a + b) = 9a$

  8. $\frac{1}{2}(f + y) = f - 5$

Solving One-Step Equations

Solve each equation. Check your solution.

1. $y - 7 = 8$

2. $w + 14 = -8$

3. $p - 4 = 6$

4. $-13 = 5 + x$

5. $98 = b + 34$

6. $y - 32 = -1$

7. $n + (-28) = 0$

8. $y + (-10) = 6$

9. $-1 = t + (-19)$

10. $j - (-17) = 36$