Precalculus

Topic: Algebraic Expressions

Instructions

Solve the following problems. Be sure to review the properties of algebraic expressions. Simplify all expressions and show all work.

Practice Problems

1. **Simplify the following expressions:**
   - i. $3x + 5x - 2x$
   - ii. $2a(b + c) - 3a$
   - iii. $(x + 4)(x - 2)$
   - iv. $(2x + 3)^2$
   - v. $\frac{4x^2-9}{2x-3}$
   - vi. $(x^2 + 2x + 1) - (x^2 - x + 4)$
   - vii. $\frac{3x^2-9}{6x}$
   - viii. $4(x + 2) - 3(x - 1)$
   - ix. $\frac{5}{x} + \frac{3}{x^2}$

2. **Factor the following expressions completely:**
   - i. $x^2 - 9$
   - ii. $3x^2 + 5x - 2$
   - iii. $4x^3 - 16x$

iv. $x^3 + 27$

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

3. **Solve for x:**

   i. $2x + 5 = 15$

   ii. $x^2 - 5x + 6 = 0$

   iii. $\frac{x+3}{2} = 5$

   iv. $x^2 + 4x - 21 = 0$

4. **Perform the indicated operations:**

   i. $(3x + 2)(x - 4)$

   ii. $\frac{x^2+2x}{x}$

   iii. $(x + 1)^2 - (x - 1)^2$

   iv. $\frac{4x^3-8x}{2x}$

5. **Evaluate the expressions when $x = 2$ and $y = -1$:**

   i. $2x^2 + 3y$

   ii. $x^3 - y^2$

   iii. $4xy + x^2$

   iv. $\frac{x^2-y}{x+y}$

6. **Factor the expression by grouping terms:**

   i. $x^3 + 3x^2 + 2x + 6$

   ii. $2a^2b + 4ab + 3a + 6$

   iii. $x^2 + xy + 3x + 3y$

   iv. $x^3 - x^2 + 2x - 2$

Multiple Choice Questions

Choose the correct answer:

1. Simplify $(x + 3)(x - 3)$:

   (a) $x^2 - 9$

   (b) $x^2 + 9$

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

(d) None of the above

2. Solve $x^2 + 2x - 8 = 0$:

   (a) $x = 4, -2$

   (b) $x = -4, 2$

   (c) $x = 2, -2$

   (d) None of the above

3. What is the factored form of $3x^2 + 12x$?

   (a) $3x(x + 4)$

   (b) $x(3x + 12)$

   (c) $3(x^2 + 4)$

   (d) None of the above

4. Which property justifies $a(b + c) = ab + ac$?

   (a) Associative Property

   (b) Distributive Property

   (c) Commutative Property

   (d) Identity Property

5. Simplify $\frac{6x^2}{3x}$:

   (a) $2x$

   (b) $3x$

   (c) $2x^2$

   (d) None of the above
