Algebra 1

Topic: Factoring Polynomials Completely

Instructions

Factor the following polynomials completely. Show all steps clearly and check your solutions. Remember to always factor out the greatest common factor (GCF) first.

Practice Problems

1. **Factor completely:**

   (i) $6x^2 + 9x$

   (ii) $12x^2 - 8x$

   (iii) $15x^2 + 10x$

   (iv) $18x^2 + 24x$

   (v) $25x^2 + 10x$

   (vi) $30x^2 + 5x$

2. **Factor completely by grouping:**

   (i) $3x^2 + 9x + 2x + 6$

   (ii) $x^2 + 5x + 3x + 15$

   (iii) $4x^2 + 12x + 3x + 9$

   (iv) $5x^2 + 15x + 2x + 6$

   (v) $6x^2 + 18x + 4x + 12$

   (vi) $8x^2 + 4x + 6x + 3$

3. **Factor the following trinomials:**

   (i) $x^2 + 7x + 10$

   (ii) $x^2 - 5x + 6$

   (iii) $x^2 + 4x - 12$

   (iv) $x^2 - 8x + 15$

   (v) $x^2 + 3x - 18$

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

4. **Factor using special products:**

   (i) $x^2 - 16$
   (ii) $x^2 - 25$
   (iii) $9x^2 - 4$
   (iv) $x^2 + 10x + 25$
   (v) $4x^2 - 12x + 9$
   (vi) $16x^2 - 40x + 25$

5. **Factor completely and solve:**

   (i) $x^2 - 5x + 6 = 0$
   (ii) $2x^2 + 7x + 3 = 0$
   (iii) $3x^2 - 14x + 8 = 0$
   (iv) $x^2 - 9x - 18 = 0$
   (v) $4x^2 + 8x = 0$
   (vi) $5x^2 + 10x - 15 = 0$

Multiple-Choice Questions

1. What is the complete factorization of $6x^2 + 9x$?

   A. $3x(2x + 3)$
   B. $6x(x + 9)$
   C. $3x(2x - 3)$
   D. $9x(2x + 3)$

2. What is the complete factorization of $x^2 + 7x + 10$?

   A. $(x + 5)(x + 2)$
   B. $(x - 5)(x - 2)$
   C. $(x - 7)(x - 10)$
   D. $(x + 10)(x + 5)$

3. What is the complete factorization of $x^2 + 4x - 12$?

   A. $(x + 6)(x - 2)$
   B. $(x - 6)(x + 2)$
   C. $(x + 4)(x - 3)$
   D. $(x + 2)(x - 6)$

4. What is the complete factorization of $x^2 - 16$?

   A. $(x - 4)(x + 4)$
   B. $(x + 4)(x + 4)$
   C. $(x - 2)(x + 2)$
   D. $(x - 5)(x + 5)$