

**P.5 Factoring Polynomials****The Difference of Two Squares:  $A^2 - B^2 = (A + B)(A - B)$** **Factoring Perfect Square Trinomials:**

$$A^2 + 2AB + B^2 = (A + B)^2$$

$$A^2 - 2AB + B^2 = (A - B)^2$$

**Factoring the Sum of Two Cubes:**

$$A^3 + B^3 = (A + B)(A^2 - AB + B^2)$$

**Factoring the Difference of Two Cubes:**

$$A^3 - B^3 = (A - B)(A^2 + AB + B^2)$$

In Exercises 1-10, factor out the greatest common factor.

1.  $18x + 27$

2.  $16x - 24$

3.  $3x^2 + 6x$

4.  $4x^2 - 8x$

5.  $9x^4 - 18x^3 + 27x^2$

6.  $6x^4 - 18x^3 + 12x^2$

7.  $x(x + 5) + 3(x + 5)$

8.  $x(2x + 1) + 4(2x + 1)$

9.  $x^2(x - 3) + 12(x - 3)$

10.  $x^2(2x + 5) + 17(2x + 5)$

In Exercise 11-16, factor by grouping.

11.  $x^3 - 2x^2 + 5x - 10$

12.  $x^3 - 3x^2 + 4x - 12$

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

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

15.  $3x^3 - 2x^2 - 6x + 4$

16.  $x^3 - x^2 - 5x + 5$

In Exercises 17-38, factor each trinomial, or state that the trinomial is prime.

17.  $x^2 + 5x + 6$

18.  $x^2 + 8x + 15$

19.  $x^2 - 2x - 15$

20.  $x^2 - 4x - 5$

21.  $x^2 - 8x + 15$

22.  $x^2 - 14x + 45$

23.  $3x^2 - x - 2$

24.  $2x^2 + 5x - 3$

25.  $3x^2 - 25x - 28$

26.  $3x^2 - 2x - 5$

27.  $6x^2 - 11x + 4$

28.  $6x^2 - 17x + 12$

29.  $4x^2 + 16x + 15$

30.  $8x^2 + 33x + 4$

31.  $9x^2 - 9x + 2$

32.  $9x^2 + 5x - 4$

33.  $20x^2 + 27x - 8$

34.  $15x^2 - 19x + 6$

35.  $2x^2 + 3xy + y^2$

36.  $3x^2 + 4xy + y^2$

37.  $6x^2 - 5xy - 6y^2$

38.  $6x^2 - 7xy - 5y^2$

In Exercises 39-48, factor the difference of two squares.

39.  $x^2 - 100$

40.  $x^2 - 144$

41.  $36x^2 - 49$

42.  $64x^2 - 81$

43.  $9x^2 - 25y^2$

44.  $36x^2 - 49y^2$

45.  $x^4 - 16$

46.  $x^4 - 1$

47.  $16x^4 - 81$

48.  $81x^4 - 1$

In Exercises 49-56, factor each perfect square trinomial.

49.  $x^2 + 2x + 1$

50.  $x^2 + 4x + 4$

51.  $x^2 - 14x + 49$

52.  $x^2 - 10x + 25$

53.  $4x^2 + 4x + 1$

54.  $25x^2 + 10x + 1$

55.  $9x^2 - 6x + 1$

56.  $64x^2 - 16x + 1$

In Exercises 57-64, factor using the formula for the sum or difference of two cubes.

57.  $x^3 + 27$

58.  $x^3 + 64$

59.  $x^3 - 64$

60.  $x^3 - 27$

61.  $8x^3 - 1$

62.  $27x^3 - 1$

63.  $64x^3 + 27$

64.  $8x^3 + 125$

In Exercises 65-92, factor completely, or state that the polynomial is prime.

65.  $3x^3 - 3x$

66.  $5x^3 - 45x$

67.  $4x^2 - 4x - 24$

68.  $6x^2 - 18x - 60$

69.  $2x^4 - 162$

70.  $7x^4 - 7$

71.  $x^3 + 2x^2 - 9x - 18$

72.  $x^3 + 3x^2 - 25x - 75$

73.  $2x^2 - 2x - 112$

74.  $6x^2 - 6x - 12$

75.  $x^3 - 4x$

76.  $9x^3 - 9x$

77.  $x^2 + 64$

78.  $x^2 + 36$

79.  $x^3 + 2x^2 - 4x - 8$

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

81.  $y^5 - 81y$

82.  $y^5 - 16y$

83.  $20y^4 - 45y^2$

84.  $48y^4 - 3y^2$