

1.6 EXERCISES

PRACTICE

Factor each polynomial by factoring out the greatest common factor. See Example 1.

1. $4m^2n + 16m^3 + 7m$

2. $3a^2b + 3a^3b - 9a^2b^2$

3. $5(a - b^2) + (a - b^2)$

4. $3x^3y - 9x^4y + 12x^3y^2$

5. $2x^6 - 14x^3 + 8x$

6. $27x^7y + 9x^6y - 9x^4yz$

7. $(x^3 - y)^2 - (x^3 - y)$

8. $6xy^3 + 9y^3 - 12xy^4$

9. $12y^6 - 8y^2 - 16y^5$

10. $(2x + y^2)^4 - (2x + y^2)^6$

Factor each polynomial by grouping. See Example 2.

11. $a^3 + ab - a^2b - b^2$

12. $ax - 2bx - 2ay + 4by$

13. $z + z^2 + z^3 + z^4$

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

15. $nx^2 - 2y - 2x^2 + ny$

16. $2ac - 3bd + bc - 6ad$

17. $ax - 5bx + 5ay - 25by$

18. $3ac - 5bd + bc - 15ad$

Use the special factoring patterns to factor the following binomials. See Example 3.

19. $4x^2 - 121$

20. $64z^3 + 216$

21. $49a^2 - 144b^2$

22. $x^3 - 27y^3$

23. $25x^4y^2 - 9$

24. $27a^9 + 8b^{12}$

25. $x^3 - 1000y^3$

26. $64x^6 - 125y^3z^9$

27. $m^6 + 125n^9$

28. $49a^6 - 9b^2c^4$

29. $27x^6 - 8y^{12}z^3$

30. $(3x - 6)^2 - (y - 2x)^2$

31. $16z^2y^4 - 9x^8$

32. $512x^6 + 729y^3$

33. $343y^9 - 27x^3z^6$

34. $(2x + y^2)^2 - (y^2 - 3)^2$

Factor the following trinomials. See Examples 4, 5, and 6.

35. $x^2 + 2x - 15$

36. $x^2 + 6x + 9$

37. $x^2 - 2x + 1$

38. $x^2 - 5x + 6$

39. $x^2 - 4x + 4$

40. $x^2 + 5x + 4$

41. $y^2 + 14y + 49$

42. $x^2 - 3x - 18$

43. $x^2 + 13x + 22$

44. $y^2 + y - 42$

45. $y^2 - 9y + 8$

46. $6x^2 + 5x - 6$

47. $5a^2 - 37a - 24$

48. $25y^2 + 10y + 1$

49. $5x^2 + 27x - 18$

50. $6y^2 - 13y - 8$

51. $16y^2 - 25y + 9$

52. $10m^2 + 29m + 10$

53. $8a^2 - 2a - 3$

54. $20y^2 + 21y - 5$

55. $12y^2 - 19y + 5$

56. $10y^2 - 11y - 6$

Factor the following algebraic expressions. See Example 7.

57. $(2x-1)^{\frac{3}{2}} + (2x-1)^{\frac{1}{2}}$

58. $2x^{-2} + 3x^{-1}$

59. $7a^{-1} - 2a^{-3}b$

60. $(3z+2)^{\frac{5}{3}} - (3z+2)^{\frac{2}{3}}$

61. $10y^{-2} - 2y^{-5}x$

62. $4y^{-3} + 12y^{-4}$

63. $(5x+7)^{\frac{7}{3}} - (5x+7)^{\frac{4}{3}}$

64. $(8x+6)^{\frac{7}{2}} - (8x+6)^{\frac{1}{2}}$

65. $7y^{-1} + 5y^{-4}$

66. $5x^{-4} - 4x^{-5}y$