

## APPENDIX A.2 EXERCISES

In Exercises 1–4, write the polynomial in standard form and state its degree.

1.  $2x - 1 + 3x^2$                       2.  $x^2 - 2x - 2x^3 + 1$   
 3.  $1 - x^7$                               4.  $x^2 - x^4 + x - 3$

In Exercises 5–8, state whether the expression is a polynomial.

5.  $x^3 - 2x^2 + x^{-1}$                   6.  $\frac{2x-4}{x}$   
 7.  $(x^2 + x + 1)^2$                       8.  $1 - 3x + x^4$

In Exercises 9–18, simplify the expression. Write your answer in standard form.

9.  $(x^2 - 3x + 7) + (3x^2 + 5x - 3)$   
 10.  $(-3x^2 - 5) - (x^2 + 7x + 12)$   
 11.  $(4x^3 - x^2 + 3x) - (x^3 + 12x - 3)$   
 12.  $-(y^2 + 2y - 3) + (5y^2 + 3y + 4)$   
 13.  $2x(x^2 - x + 3)$                   14.  $y^2(2y^2 + 3y - 4)$   
 15.  $-3u(4u - 1)$                       16.  $-4v(2 - 3v^3)$   
 17.  $(2 - x - 3x^2)(5x)$               18.  $(1 - x^2 + x^4)(2x)$

In Exercises 19–40, expand the product. Use vertical alignment in Exercises 33 and 34.

19.  $(x - 2)(x + 5)$                       20.  $(2x + 3)(4x + 1)$   
 21.  $(3x - 5)(x + 2)$                   22.  $(2x - 3)(2x + 3)$   
 23.  $(3x - y)(3x + y)$               24.  $(3 - 5x)^2$   
 25.  $(3x + 4y)^2$                       26.  $(x - 1)^3$   
 27.  $(2u - v)^3$                         28.  $(u + 3v)^3$   
 29.  $(2x^3 - 3y)(2x^3 + 3y)$         30.  $(5x^3 - 1)^2$   
 31.  $(x^2 - 2x + 3)(x + 4)$         32.  $(x^2 + 3x - 2)(x - 3)$   
 33.  $(x^2 + x - 3)(x^2 + x + 1)$   
 34.  $(2x^2 - 3x + 1)(x^2 - x + 2)$   
 35.  $(x - \sqrt{2})(x + \sqrt{2})$               36.  $(x^{1/2} - y^{1/2})(x^{1/2} + y^{1/2})$   
 37.  $(\sqrt{u} + \sqrt{v})(\sqrt{u} - \sqrt{v})$         38.  $(x^2 - \sqrt{3})(x^2 + \sqrt{3})$   
 39.  $(x - 2)(x^2 + 2x + 4)$         40.  $(x + 1)(x^2 - x + 1)$

In Exercises 41–44, factor out the common factor.

41.  $5x - 15$                             42.  $5x^3 - 20x$   
 43.  $yz^3 - 3yz^2 + 2yz$               44.  $2x(x + 3) - 5(x + 3)$

In Exercises 45–48, factor the difference of two squares.

45.  $z^2 - 49$                             46.  $9y^2 - 16$   
 47.  $64 - 25y^2$                         48.  $16 - (x + 2)^2$

In Exercises 49–52, factor the perfect square trinomial.

49.  $y^2 + 8y + 16$                       50.  $36y^2 + 12y + 1$   
 51.  $4z^2 - 4z + 1$                       52.  $9z^2 - 24z + 16$

In Exercises 53–58, factor the sum or difference of two cubes.

53.  $y^3 - 8$                                 54.  $z^3 + 64$   
 55.  $27y^3 - 8$                             56.  $64z^3 + 27$   
 57.  $1 - x^3$                                 58.  $27 - y^3$

In Exercises 59–68, factor the trinomial.

59.  $x^2 + 9x + 14$                       60.  $y^2 - 11y + 30$   
 61.  $z^2 - 5z - 24$                       62.  $6t^2 + 5t + 1$   
 63.  $14u^2 - 33u - 5$                   64.  $10v^2 + 23v + 12$   
 65.  $12x^2 + 11x - 15$                 66.  $2x^2 - 3xy + y^2$   
 67.  $6x^2 + 11xy - 10y^2$             68.  $15x^2 + 29xy - 14y^2$

In Exercises 69–74, factor by grouping.

69.  $x^3 - 4x^2 + 5x - 20$               70.  $2x^3 - 3x^2 + 2x - 3$   
 71.  $x^6 - 3x^4 + x^2 - 3$                 72.  $x^6 + 2x^4 + x^2 + 2$   
 73.  $2ac + 6ad - bc - 3bd$   
 74.  $3uw + 12uz - 2vw - 8vz$

In Exercises 75–90, factor completely.

75.  $x^3 + x$                                 76.  $4y^3 - 20y^2 + 25y$   
 77.  $18y^3 + 48y^2 + 32y$               78.  $2x^3 - 16x^2 + 14x$   
 79.  $16y - y^3$                             80.  $3x^4 + 24x$   
 81.  $5y + 3y^2 - 2y^3$                 82.  $z - 8z^4$   
 83.  $2(5x + 1)^2 - 18$                 84.  $5(2x - 3)^2 - 20$   
 85.  $12x^2 + 22x - 20$                 86.  $3x^2 + 13xy - 10y^2$   
 87.  $2ac - 2bd + 4ad - bc$         88.  $6ac - 2bd + 4bc - 3ad$   
 89.  $x^3 - 3x^2 - 4x + 12$               90.  $x^4 - 4x^3 - x^2 + 4x$

91. **Writing to Learn** Show that the grouping

$$(2ac + bc) - (2ad + bd)$$

leads to the same factorization as in Example 11b. Explain why the third possibility,

$$(2ac - bd) + (-2ad + bc)$$

does not lead to a factorization.