Chapter 4

Exercise Set 4.1

Perform the indicated operations and simplify.

1. $(4x-3)-(7x-5)$

2. $9-3(1-4y)$

3. $(2x^2-5x+8)+(5x^2-7x-12)$

4. $(3x^2-5x+8)-(8x^2-7x-11)$

5. $(x^2-3x)-(x^3-x^2-6x+1)$

6. $2(3t+1)-4(1-3t)$

7. $2x(x^2-1)+4(x^3-5x)$

8. $-3(5t^2-4)-t(2t-1)$

9. $4(x^2-x+5)-3(x^2-4x-3)$

10. $y^2(1-y)+3y(y^2-5y+1)$

11. Add x^3-3x^2+5x-7 and x^4-4x^3-x+9

12. Add $1-3y+5y^2$ and $4+8y-12y^2-6y^3$

13. Subtract x^2-2x-5 from $6x^2+5x-9$

14. Subtract $-5x^2+7x-3$ from x^3+4x^2-3

15. $\frac{1}{5}x+\frac{3}{5}x$

16. $\frac{7}{3}x^3-\frac{2}{3}x^3$

17. $t+\frac{1}{4}t$

18. $\frac{3}{8}t+2t$

19. $\frac{1}{3}x+\frac{3}{4}x+x$

20. $\frac{3}{8}x^2-\frac{1}{6}x^2$

21. $\frac{5x}{6}+\frac{3x}{4}$

22. $3x^2-\frac{x^2}{3}+\frac{4x^2}{5}$

23. $\left(x^2-\frac{3}{2}x+\frac{1}{4}\right)-\left(\frac{2}{5}x^2-\frac{5}{8}x+\frac{1}{3}\right)$

24. $\left(\frac{2x^2}{5}-\frac{x}{2}+\frac{5}{6}\right)-\left(\frac{1}{2}x^2-\frac{x}{8}-\frac{2}{3}\right)$

Exercise Set 4.2

Perform the indicated operations and simplify.

1. $3x^2(x^4-2x^3-x+5)$

2. $x^2y^3(x^4-x^2y^2+y^4)$

3. $2a^5(a^3-3a^2b-4b^3)$

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

5. $(3t-2)(5t+4)$

6. $(t-2)(5t+6)$

7. $2(3x+1)(x+5)$

8. $(x^2+y^2)(x^2-y^2)$

9. $(5y-4)(y-3)$

10. $3(2x-1)(4x+7)$

11. $(3x-2)^2$

12. $(3x-2)(3x-2)$

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

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

15. $(1-3x)^2$

16. $(a+b)^2$

17. $(y+2)(y^2-3y+4)$

18. $(a-b)(a^2+ab+b^2)$

19. $(x+2)^3$

20. $(x^3+2y^5)(x^3-2y^5)$

21. $(x^3+2y^5)(x^3+2y^5)$

22. $(x+3y)(x^2-6xy+9y^2)$

23. $(x+1)(x+1)^2$

24. $(2a-3)(a^2+a+1)$

25. $(2x-1)^3$

26. $(a+b)^3$

Exercise Set 4.3

Find the greatest common factor (GCF) of the terms in the expression. Write the expression by factoring out the GCF in each of its terms and then use the distributive law to write the expression in factored form.

1. $4x^3+8x$

2. $10y+15$

3. $24x^3-8x^5$

4. $a^2b^5+a^3b^3$

5. $3a^2b-7a^3b^4$

6. $27x^5y^4-18x^2y^3$

7. $45t^5-30t^3$

8. $5s^2t^2-st$

9. $6y^2(x+1)+8y(x+1)$

10. $x(5x-1)+3(5x-1)$

11. $4a(a-1)-7(a-1)$

12. $18x^2y^2(x-y)+12xy^3(x-y)$

13. $9a^2b+6ab^3+15a^4b^2$

14. $x^4+3x^3-18x^2$

15. $8x^2-20x+32$

16. $12a^6b^2-9a^5b^3+15a^4b^4$

17. $24x^2(x+2)+30x(x+2)+15(x+2)$

18. $9x^3(2y-1)-8x^5(2y-1)+18x^7(2y-1)$

Factor the trinomial.

19. x^2+2x-3

20. x^2-5x+4

21. x^2-x-6

22. $x^2-7x+10$

23. $x^2-5x-24$

24. $x^2-11x+18$

25. $x^2-8xy+7y^2$

26. x^2-4y^2

27. $a^2+ab-12b^2$

28. $x^2-14xy+24$

29. $9s^2-16t^2$

30. $a^2-4ab-21b^2$

31. $t^2+3t-40$

32. $x^2-8xy-48y^2$

33. $y^2+2y-24$

34. x^2-81

Complete the factorization.

35. $2x^2+5x-3=(2x\quad)(x\quad)$

36. $6x^2+7x-5=(3x\quad)(2x\quad)$

37. $6x^2-11x-2=(6x\quad)(x\quad)$

38. $8x^2-2x-15=(4x\quad)(2x\quad)$

39. $8x^2-26x+15=(4x\quad)(2x\quad)$

40. $5x^2-13x+6=(5x\quad)(x\quad)$

41. $12x^2+16x-3=(6x\quad)(2x\quad)$

42. $12x^2+41x+35=(4x\quad)(3x\quad)$

43. $5x^2-23x+24=(5x\quad)(x\quad)$

44. $5x^2+14x-24=(5x\quad)(x\quad)$

Factor the trinomial.

45. $2x^2+5x-3$

46. $2y^2-19y-10$

47. $3a^2+8a+5$

48. $5x^2+7x-6$

49. $3t^2+13t-10$

50. $3y^2-2y-1$

51. $4x^2-4x-3$

52. $4x^2-11x-3$

53. $9a^2-18a-16$

54. $4y^2+12y+9$

55. $6x^2-x-12$

56. $2y^2-11y+14$

57. $6b^2+7b-3$

58. $4s^2-9s+2$

59. $15x^2+16x+4$

60. $8t^2+5t-22$

61. $2x^2+xy-6y^2$

62. $2s^2-11st+5t^2$

63. $6a^2-7ab+2b^2$

64. $9x^2+24xy+16y^2$

Factor the expression completely.

65. $12x^3+18x$

66. $6a^4b^2-9a^3b^3$

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

68. $9x^2-36x-45$

69. $3x^2-27$

70. $2t^2+5t+3$

71. $10x^4 - 35x^3 + 15x^2$

72. $2x^4 - 18x^2$

73. $a^4b^3 - a^2b^5$

74. $12y^3 + 50y^2 + 28y$

75. $6x^3 + 45x^2 + 21x$

76. $12a^2 + 36ab + 27b^2$

77. $2x^3y^2 + 13x^2y^2 + 15xy^2$

78. $14t^5 - 38t^4 + 20t^3$

79. $x^6y^2 - 9x^4y^4$

80. $6x^2 - xy - 12y^2$

81. $6x^2 - xy - 12y^2$

82. $3x^2 + 10xy - 24y^2$

83. $5ab^2x^2 - 10ab^2x - 15ab^2$

84. $24a^2 - 18ab + 3b^2$

85. $x^4 + 5x^2 + 6$

86. $2x^4 - 5x^2 + 3$

87. $x^4 - y^4$

88. $a^6(a+1)^2 + a^7(a+1)$

89. $(x-2)(x+5)^2 + (x-2)^2(x+5)$

90. $x^2(x^2-1) - 9(x^2-1)$

91. $9x^4 - 49$

92. $5a^3 - 125a$

93. $x^2(x-3) - 4(x-3)$

94. $a^2(x-y) - b^2(x-y)$

95. $5x^4 - 80y^4$

96. $4x^2 + 24xy + 36y^2$