Extra Practice

Chapter 8

Lesson 8-1

Find the degree of each monomial.

1. $7r^3$ **3**

2. $-4n^2$ **2**

3. 9   **0**

4. $16w^{12}$ **12**

5. $15a^5b^2$ **7**

6. $-4x^2y^3z^4$ **9**

Write each polynomial in standard form. Then name each polynomial based on degree and number of terms.

7. $4x + x^2 - 1$
$x^2 + 4x - 1$**; quadratic trinomial**

8. $2n^2 + 3n^3$
$3n^3 + 2n^2$**; cubic binomial**

9. $-4y$
$-4y$**; linear monomial**

10. $w + 3 - 2w + 8w^3$
$8w^3 - w + 3$**; cubic trinomial**

11. 5
5; constant monomial

12. $14d - d^4 + 3d$
$-d^4 + 17d$**;**
fourth degree binomial

Simplify. Write each answer in standard form.

13. $(5x^3 + 3x^2 - 7x + 10) - (3x^3 - x^2 + 4x - 1)$ $2x^3 + 4x^2 - 11x + 11$

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

15. $(4m^3 + 7m - 4) + (2m^3 - 6m + 8)$ $6m^3 + m + 4$

16. $(8t^2 + t + 10) - (9t^2 - 9t - 1)$ $-t^2 + 10t + 11$

17. $(-7c^3 + c^2 - 8c - 11) - (3c^3 + 2c^2 + c - 4)$ $-10c^3 - c^2 - 9c - 7$

18. $(6v + 3v^2 - 9v^3) + (7v - 4v^2 - 10v^3)$ $-19v^3 - v^2 + 13v$

19. $(s^4 - s^3 - 5s^2 + 3s) - (5s^4 + s^3 - 7s^2 - s)$ $-4s^4 - 2s^3 + 2s^2 + 4s$

20. $(9w - 4w^2 + 10) + (8w^2 + 7 + 5w)$ $4w^2 + 14w + 17$

21. The sides of a rectangle are $4t - 1$ and $5t + 9$. Write an expression for the perimeter of the rectangle. $18t + 16$

22. Three consecutive integers are $n - 1$, n, and $n + 1$. Write an expression for the sum of the three integers. $3n$

Find an expression for the perimeter of each figure.

23. A rectangle has side lengths $4k - 3$ and $2k + 2$. $12k - 2$

24. A triangle has side lengths $2t^2$, $4t - 3$, and $10 - 2t$. $2t^2 + 2t + 7$

25. A rhombus has two sides $3d^3 - 2d$ long and two sides $d^2 + 5$ long.
$6d^3 + 2d^2 - 4d + 10$

Extra Practice (continued)

Chapter 8

Lesson 8-2

Simplify each product.

26. $2y(y + 1)$
$\mathbf{2y^2 + 2y}$

27. $4b(b^2 + 3)$
$\mathbf{4b^3 + 12b}$

28. $9c(c^2 - 3c + 5)$
$\mathbf{9c^3 - 27c^2 + 45c}$

29. $8m(4m - 5)$
$\mathbf{32m^2 - 40m}$

30. $5k(k^2 + 8k)$
$\mathbf{5k^3 + 40k^2}$

31. $5r^2(r^2 + 4r - 2)$
$\mathbf{5r^4 + 20r^3 - 10r^2}$

32. $2m^2(m^3 + m - 2)$
$\mathbf{2m^5 + 2m^3 - 4m^2}$

33. $-3x(x^2 + 3x - 1)$
$\mathbf{-3x^3 - 9x^2 + 3x}$

34. $-x(1 + x + x^2)$
$\mathbf{-x^3 - x^2 - x}$

Find the GCF terms of each polynomial. Factor.

35. $3y^4 - 9y^2$
$\mathbf{3y^2(y^2 - 3)}$

36. $t^6 + t^4 - t^5 + t^2$
$\mathbf{t^2(t^4 - t^3 + t^2 + 1)}$

37. $3m^2 - 6 + 9m$
$\mathbf{3(m^2 + 3m - 2)}$

38. $16c^2 - 4c^3 + 12c^5$
$\mathbf{4c^2(3c^3 - c + 4)}$

39. $8v^6 + 2v^5 - 10v^9$
$\mathbf{-2v^5(5v^4 - 4v - 1)}$

40. $6n^2 - 3n^3 + 2n^4$
$\mathbf{n^2(2n^2 - 3n + 6)}$

41. $5r + 20r^3 + 15r^2$
$\mathbf{5r(4r^2 + 3r + 1)}$

42. $9x^6 + 5x^5 + 4x^7$
$\mathbf{x^5(4x^2 + 9x + 5)}$

43. $4d^8 - 2d^{10} + 7d^4$
$\mathbf{-d^4(2d^6 - 4d^4 - 7)}$

44. A rectangular roof has a length of $13g$ and a width of $4g + 7$. Write an expression for the area of the roof. $\mathbf{52g^2 + 91g}$

45. A cylinder has a base area of $3w^2 + 5$ and a height of $4w$. Find an expression for the volume. $\mathbf{12w^3 + 20w}$

Lessons 8-3 and 8-4

Simplify each product. Write in standard form.

46. $(5c + 3)(-c + 2)$
$\mathbf{-5c^2 + 7c + 6}$

47. $(3t - 1)(2t + 1)$
$\mathbf{6t^2 + t - 1}$

48. $(w + 2)(w^2 + 2w - 1)$
$\mathbf{w^3 + 4w^2 + 3w - 2}$

49. $(3t + 5)(t + 1)$
$\mathbf{3t^2 + 8t + 5}$

50. $(2n - 3)(2n + 4)$
$\mathbf{4n^2 + 2n - 12}$

51. $(b + 3)(b + 7)$
$\mathbf{b^2 + 10b + 21}$

52. $(3x + 1)^2$
$\mathbf{9x^2 + 6x + 1}$

53. $(5t + 4)^2$
$\mathbf{25t^2 + 40t + 16}$

54. $(w - 1)(w^2 + w + 1)$
$\mathbf{w^3 - 1}$

55. $(a + 4)(a - 4)$
$\mathbf{a^2 - 16}$

56. $(3y - 2)(3y + 2)$
$\mathbf{9y^2 - 4}$

57. $(w^2 + 2)(w^2 - 2)$
$\mathbf{w^4 - 4}$

58. **Geometry** A rectangle has dimensions $3x - 1$ and $2x + 5$. Write an expression for the area of the rectangle as a product and in standard form. $\mathbf{(3x - 1)(2x + 5), 6x^2 + 13x - 5}$

59. Write an expression for the product of the two consecutive odd integers $n - 1$ and $n + 1$. $\mathbf{(n - 1)(n + 1) = n^2 - 1}$

Extra Practice (continued)

Chapter 8

60. A circular pool has a radius of $5p - 3$ m. Write an expression for area the pool. $\mathbf{25p^2\pi - 30p\pi + 9\pi}$

61. An office building has a rectangular base with side lengths of $12y - 7$ and $22y + 4$. Write an expression for the area of a floor in the office building. $\mathbf{264y^2 - 106y - 28}$

62. Suppose you play a game with two number cubes. Let A represent rolling a number less than 4 and B represent rolling a number greater than 4. The probability of A is $\frac{1}{2}$. The probability of B is $\frac{1}{3}$.

   a. Find $\left(\frac{1}{2}A + \frac{1}{3}B\right)^2$ $\mathbf{\frac{1}{4}A^2 + \frac{1}{3}AB + \frac{1}{9}B^2}$

   b. What is the probability that both cubes show a number less than 4? $\mathbf{\frac{1}{4}}$

   c. What is the probability that one cube shows a number less than 4 and the other cube shows a number greater than 4? $\mathbf{\frac{1}{6}}$

63. Suppose there are two squares with side lengths of $4x - 3$ and $2x + 4$. Write an expression for the area of each square. Find the area of each square if $x = 6$ cm. $\mathbf{16x^2 - 24x + 9, 4x^2 + 16x + 16; 441\ cm^2, 256\ cm^2}$

64. A rectangle has dimensions of $2x + 3$ and $4x - 3$. Write an expression for the area of the rectangle. Then find the area of the rectangle if $x = 3$ ft. $\mathbf{8x^2 + 6x - 9; 81\ ft^2}$

Lessons 8-5 to 8-7

Factor each expression.

65. $x^2 - 4x + 3$
$\mathbf{(x - 3)(x - 1)}$

66. $3x^2 - 4x + 1$
$\mathbf{(3x - 1)(x - 1)}$

67. $v^2 + v - 2$
$\mathbf{(v - 1)(v + 2)}$

68. $5t^2 - t - 18$
$\mathbf{(t - 2)(5t + 9)}$

69. $m^2 + 9m - 22$
$\mathbf{(m - 2)(m + 11)}$

70. $x^2 - 2x - 15$
$\mathbf{(x - 5)(x + 3)}$

71. $2n^2 + n - 3$
$\mathbf{(n - 1)(2n + 3)}$

72. $2h^2 - 5h - 3$
$\mathbf{(h - 3)(2h + 1)}$

73. $m^2 - 25$
$\mathbf{(m - 5)(m + 5)}$

74. $9y^2 - 1$
$\mathbf{(3y + 1)(3y - 1)}$

75. $9y^2 + 6y + 1$
$\mathbf{(3y + 1)^2}$

76. $p^2 + 2p + 1$
$\mathbf{(p + 1)^2}$

77. $x^2 + 6x + 9$
$\mathbf{(x + 3)^2}$

78. $25x^2 - 9$
$\mathbf{(5x + 3)(5x - 3)}$

79. $4t^2 + t - 3$
$\mathbf{(t + 1)(4t - 3)}$

80. $9c^2 - 169$
$\mathbf{(3c - 13)(3c + 13)}$

81. $4m^2 - 121$
$\mathbf{(2m + 11)(2m - 11)}$

82. $3v^2 + 10v - 8$
$\mathbf{(v + 4)(3v - 2)}$

83. $4g^2 + 4g + 1$
$\mathbf{(2g + 1)^2}$

84. $-w^2 + 5w - 4$
$\mathbf{-(w - 4)(w - 1)}$

85. $9t^2 + 12t + 4$
$\mathbf{(3t + 2)^2}$

Extra Practice (continued)

Chapter 8

86. $12m^2 - 5m - 2$
(3m − 2)(4m + 1)

87. $36s^2 - 1$
(6s + 1)(6s − 1)

88. $c^2 - 10c + 25$
(c − 5)²

89. Write an expression for the side length of a square that has an area of $h^2 - 12h + 36$. **h − 6**

90. Write an expression for the radius of a circular flower garden with an area of $\pi m^2 + 14\pi m + 49\pi$. **m + 7**

Use factoring to find expressions for possible dimensions of each figure.

91. A rectangular parking lot has an area of $10w^2 - 9w - 40$. **(5w + 8) by (2w − 5)**

92. A rectangular door has an area of $12d^2 - 31d + 14$ **(12d − 7) by (d − 2)**

93. A circular window has an area of $49\pi v^2 + 84\pi v + 36\pi$. **radius: (7v + 6)**

94. A rectangular field has an area of $64m^2 - 169n^2$. **(8m − 13n) by (8m + 13n)**

95. A rectangular prism has a volume of $6t^3 + 44t^2 + 70t$. **2t by (3t + 7) by (t + 5)**

Lesson 8-8

Factor each expression.

96. $3y^3 + 9y^2 - y - 3$
(y + 3)(3y² − 1)

97. $3u^3 + u^2 - 6u - 2$
(3u + 1)(u² − 2)

98. $w^3 - 3w^2 + 3w - 9$
(w − 3)(w² + 3)

99. $4z^3 + 2z^2 - 2z - 1$
(2z + 1)(2z² − 1)

100. $3x^3 + 8x^2 - 3x$
x(x + 3)(3x − 1)

101. $y^5 - 9y$
y(y² − 3)(y² + 3)

102. $2p^3 - 4p^2 + 2p - 4$
2(p − 2)(p² + 1)

103. $3y^3 - 3y^2 - 6y$
3y(y − 2)(y + 1)

104. $2n^3 + 10n^2 + 3n + 15$
(2n² + 3)(n + 5)

Use factoring to find expressions for possible dimensions of each figure.

105. A rectangular field has an area of $10k^3 + 25k^2 - 6k - 15$. **(5k² − 3) by (2k + 5)**

106. A rectangular swimming pool has an area of $5x^3 + 5x^2 - 2x - 2$. **(5x² − 2)(x + 1)**

107. A rectangular sheet of paper has an area of $6n^3 + 9n^2 - 8n - 12$.   **(3n² − 4)(2n + 3)**