

Name: \_\_\_\_\_

**Concept and Vocabulary Check:**

1. The process of writing a polynomial containing the sum of monomials as a product is called \_\_\_\_\_.
2. An expression of the highest degree that divides each term of a polynomial is called the \_\_\_\_\_. The variable part of this expression contains the \_\_\_\_\_ power of a variable that appears in all terms of the polynomial.

**Practice Exercises:**

In exercises 3 - 11 odd, find the greatest common factor of each list of monomials.

3.  $12x^2$  and  $8x$

7.  $9y^5$ ,  $18y^2$ , and  $-3y$

5.  $-2x^4$  and  $6x^3$

11.  $16x^5y^4$ ,  $8x^6y^3$ , and  $20x^4y^5$

In exercises 15 - 47 odd, factor each polynomial using the greatest common factor. If there is no common factor other than 1 and the polynomial cannot be factored, state that it is prime.

15.  $4y - 4$

31.  $8x^2 - 4x^4$

17.  $5x + 30$

33.  $12y^2 + 16y - 8$

23.  $18y^2 + 12$

39.  $10x - 20x^2 + 5x^3$

25.  $14x^3 + 21x^2$

43.  $6x^3y^2 + 9xy$

45.  $30x^2y^3 - 10xy^2 + 20xy$

47.  $32x^3y^2 - 24x^3y - 16x^2y$

In exercises 49 - 55 odd, factor each polynomial using the negative of the greatest common factor.

49.  $-12x^2 + 18$

55.  $-12x^3y^2 - 18x^3y + 24x^2y$

53.  $-4a^3b^2 + 6ab$

In exercises 57 - 67 odd, factor each polynomial using the greatest common binomial factor.

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

63.  $3x(x + y) - (x + y)$

61.  $x(y + 6) - 7(y + 6)$

67.  $7x^2(5x + 4) + 5x + 4$

In exercises 69 - 85 odd, factor by grouping.

69.  $x^2 + 2x + 4x + 8$

79.  $xy - x + 5y - 5$

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

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

81.  $3x^2 - 6xy + 5xy - 10y^2$

85.  $x^2 - ax - bx + ab$

In exercises 87 - 93 odd, factor each polynomial completely.

87.  $24x^3y^3z^3 + 30x^2y^2z + 18x^2yz^2$

91.  $4x^5(x + 1) - 6x^3(x + 1) - 8x^2(x + 1)$

93.  $3x^5 - 3x^4 + x^3 - x^2 + 5x - 5$

95. **COPY** the figure from page 424 here. Write a polynomial that represents the shaded area of the figure. Then, factor the polynomial.

### Applications:

97. An explosion causes debris to rise vertically with an initial velocity of 64 feet per second. The polynomial  $64x - 16x^2$  describes the height of the debris above the ground, in feet, after  $x$  seconds.

a. Find the height of the debris after 3 seconds.

c. Use the factored form of the polynomial in part (b) to find the height of the debris after 3 seconds. Do you get the same answer as you did in part (a)? If so, does this prove that your factorization is correct? Explain.

b. Factor the polynomial.

### Writing in Mathematics:

101. What is factoring?

102. What is a prime polynomial?