

Concept and Vocabulary Check:

Fill in each blank by writing the letter of the technique (a through h) for factoring the polynomial shown below.

1. $-3x^2 + 21x$

3. $27x^3 - 1$

5. $4x^2 + 8x + 3$

7. $5x^2 + 10x$

2. $16x^2 - 25$

4. $x^2 + 7x + xy + 7y$

6. $9x^2 + 24x + 16$

8. $x^3 + 1000$

a. Factoring out the GCF

b. Factoring out the negative GCF

c. Factoring by Grouping

d. Factoring trinomials by the AC method

e. Factoring the difference of two squares
 $A^2 - B^2 = (A + B)(A - B)$

f. Factoring perfect square trinomials

$$A^2 + 2AB + B^2 = (A + B)^2$$

$$A^2 - 2AB + B^2 = (A - B)^2$$

g. Factoring the sum of two cubes

$$A^3 + B^3 = (A + B)(A^2 - AB + B^2)$$

h. Factoring the difference of two cubes

$$A^3 - B^3 = (A - B)(A^2 + AB + B^2)$$

Practice Exercises:

In exercises 1 - 105, factor completely or state that the polynomial is prime. Check your factorizations using multiplication.

1. $-7x^2 + 35x$

5. $27x^3 - 1$

9. $14x^2 - 9x + 1$

23. $2x^4 - 162$

15. $6x^2 + x - 15$

27. $3x^3 - 24x^2 + 48x$

17. $5x^3 - 20x$

29. $2x^5 + 2x^2$

21. $5x^2 - 5x - 30$

31. $6x^2 + 8x$

33. $-2y^2 + 2y + 112$

49. $9y^2 + 13y + 4$

37. $y^2 + 8y - 16$

53. $16^2 + 24y + 9$

41. $r^2 - 25r$

55. $-4y^3 + 28y^2 - 40y$

45. $x^3 - 4x$

57. $y^5 - 81y$

$$59. 20a^4 - 45a^2$$

$$69. 2y^3 + 3y^2 - 50y - 75$$

$$63. 12y^2 - 11y + 2$$

$$73. 8x^5 - 2x^3$$

$$65. 9y^2 - 64$$

$$75. 3x^2 + 243$$

$$67. 9y^2 + 64$$

$$77. x^4 + 8x$$

$$81. 6x^2 + 8xy$$

$$95. 7x^5y - 7xy^5$$

$$83. xy - 7x + 3y - 21$$

$$97. 10x^3y - 14x^2y^2 + 4xy^3$$

$$87. 72a^3b^2 + 12a^2 - 24a^4b^2$$

$$101. 15a^2 + 11ab - 14b^2$$

$$91. 48x^4y - 3x^2y$$

$$105. a^2y - b^2y - a^2x + b^2x$$

109. $2x^4 + 6x^3y + 2x^2y^2$

117. $(x - 7)^2 - 4a^2$

113. $10x^2(x + 1) - 7x(x + 1) - 6(x + 1)$

121. $y^7 + y$

Applications:

123. A rock is dropped from the top of a 256-foot cliff. The height, in feet, of the rock above the water after t seconds is modeled by the polynomial $256 - 16t^2$. Factor this expression completely.

125. First, **COPY** the figure from page 461 for this problem below. Then, express the area of the shaded ring shown in the figure in terms of π . Then factor this expression completely.