SECTION 8A Ready To Go On? Skills Intervention

8-2 Factoring by GCF

Factoring by Using the GCF
Factor each polynomial. Check your answer.

A. $8y^3 + 24y^2$

Find the GCF of each term.

$8y^3 = 2 \cdot \underline{2} \cdot \underline{2} \cdot y \cdot \underline{y} \cdot \underline{y}$

$24y^2 = 2 \cdot \underline{2} \cdot \underline{2} \cdot \underline{3} \cdot y \cdot \underline{y}$

The GCF is $2 \cdot \underline{2} \cdot \underline{2} \cdot \underline{y} \cdot \underline{y} = 8\underline{y^2}$.

Write terms as products using the GCF as a factor. $y(8y^2) + 3\underline{(8y^2)}$

Use the Distributive Property to factor out the GCF. $8y^2(\underline{y} + \underline{3})$

Check: Multiply to check your answer. $8y^2(\underline{y} + \underline{3}) = 8y^3 + 24y^2$

B. $4x^2 + 20x + 28$

Find the GCF of each term.

$4x^2 = 2 \cdot \underline{2} \cdot \underline{x} \cdot \underline{x}$

$20x = 2 \cdot \underline{2} \cdot \underline{5} \cdot \underline{x}$

$28 = 2 \cdot \underline{2} \cdot \underline{7}$

The GCF is $2 \cdot \underline{2} = \underline{4}$.

Write terms as products using the GCF as a factor. $x^2(4) + 4\underline{(5x)} + \underline{4}(7)$

Use the Distributive Property to factor out the GCF. $4(\underline{x^2} + 5x + \underline{7})$

Check: Multiply to check your answer. $4(\underline{x^2} + 5x + \underline{7}) = 4x^2 + 20x + 28$

Factoring by Grouping
Factor the polynomial, $4a^3 + 8a^2 - 3a - 6$, by grouping. Check your answer.

Group terms that have a common number of variables as a factor. $(4a^3 + 8a^2) + (-3a - 6)$

What is the GCF of $4a^3$ and $8a^2$? $\underline{4a^2}$ What is the GCF of $-3a$ and -6? $\underline{-3}$

Write each group with the GCF. $\underline{4a^2}(a + \underline{2}) + (-3)(a + \underline{2})$

Factor out the common factor of $a + 2$. $(a + 2)(\underline{4a^2} - \underline{3})$

Multiply to check your solution.

$(a + 2)(\underline{4a^2} - \underline{3}) = \underline{a}(4a^2) + \underline{a}(-3) + \underline{2}(4a^2) + \underline{2}(-3)$

$= \underline{4a^3} - 3a + \underline{8a^2} - 6$ Multiply.

$= \underline{4a^3} + 8a^2 - \underline{3a} - 6$ Rewrite in descending order.

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SECTION 8A Ready To Go On? Skills Intervention

8-3 Factoring $x^2 + bx + c$

Factoring $x^2 + bx + c$ When c is Positive.
Factor each trinomial. Check your answer.

A. $x^2 + 9x + 14$

When the constant term is positive, its factors have the $\underline{\text{same}}$ sign.

What is the value of the c term? $\underline{14}$ What is the value of the b term? $\underline{9}$

Factors of 14	Sum
1 and $\underline{14}$	15
2 and $\underline{7}$	$\underline{9}$

What are the factors of c whose sum is b? $\underline{2}$ and $\underline{7}$

Complete: $(x + \underline{2})(x + \underline{7})$

Check using FOIL $(\underline{x + 2})(\underline{x + 7}) = x^2 + \underline{7x} + 2x + \underline{14}$

$x^2 + \underline{9x} + \underline{14}$

B. $x^2 + 8x + 15$

What is the value of the c term? $\underline{15}$ What is the value of the b term? $\underline{8}$

Factors of 15	Sum
1 and $\underline{15}$	16
3 and $\underline{5}$	$\underline{8}$

What are the factors of c whose sum is b? $\underline{3}$ and $\underline{5}$

Complete: $(x + \underline{3})(x + \underline{5})$

Check using FOIL $(\underline{x + 3})(\underline{x + 5}) = x^2 + 5x + \underline{3x} + \underline{15}$

$x^2 + \underline{8x} + \underline{15}$

Factoring $x^2 + bx + c$ When c is Negative
Factor the trinomial $x^2 + 3x - 18$. Check your answer.

When the constant term of a trinomial is negative, its factors have $\underline{\text{opposite}}$ signs.

What is the value of the c term? $\underline{-18}$ What is the value of the b term? $\underline{3}$

Factors of -18	Sum
-1 and $\underline{18}$	17
-2 and $\underline{9}$	$\underline{7}$
-3 and $\underline{6}$	$\underline{3}$

What are the factors of c whose sum is b? $\underline{-3}$ and $\underline{6}$

Complete: $(x - \underline{3})(x + \underline{6})$

Check using FOIL $(\underline{x - 3})(\underline{x + 6}) = x^2 + \underline{6x} - 3x - \underline{18}$

$x^2 + \underline{3x} - \underline{18}$

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SECTION 8A Ready To Go On? Problem Solving Intervention

8-4 Factoring $ax^2 + bx + c$

Factoring $ax^2 + bx + c$ when c is Positive.
Factor the trinomial $2x^2 + 9x + 10$. Check your answer.

What is the value of a? $\underline{2}$ What is the value of c? $\underline{10}$

What is the sum of the inner and outer products? $\underline{9}$

Factors of 2	Factors of 10	Outer + Inner
$1 \cdot 2$	$1 \cdot 10$	$1 \cdot 10 + 2 \cdot 1 = 12$
$1 \cdot 2$	$10 \cdot 1$	$1 \cdot 1 + 2 \cdot \underline{10} = 21$
$1 \cdot 2$	$5 \cdot \underline{2}$	$1 \cdot 2 + 2 \cdot \underline{5} = \underline{12}$
$1 \cdot 2$	$2 \cdot \underline{5}$	$1 \cdot 5 + 2 \cdot \underline{2} = \underline{9}$

$(x + \underline{2})(2x + \underline{5})$ Complete the factoring.

Check $(\underline{x + 2})(\underline{2x + 5}) = 2x^2 + \underline{5x} + \underline{4x} + \underline{10}$

$= 2x^2 + \underline{9x} + 10$

Factoring $ax^2 + bx + c$ when c is Negative
Factor the trinomial $4x^2 + 21x - 18$. Check your answer.

What is the value of a? $\underline{4}$ What is the value of c? $\underline{-18}$

What is the sum of the inner and outer products? $\underline{21}$

Factors of 4	Factors of -18	Outer + Inner
$1 \cdot 4$	$1(-18)$	$1 \cdot -18 + 4 \cdot 1 = -14$
$1 \cdot 4$	$-18(1)$	$1 \cdot 1 + 4 \cdot -18 = \underline{-71}$
$1 \cdot 4$	$2 \cdot \underline{-9}$	$1 \cdot -9 + 4 \cdot \underline{2} = \underline{-1}$
$1 \cdot 4$	$-9 \cdot \underline{2}$	$1 \cdot \underline{2} + 4 \cdot \underline{-9} = \underline{-34}$
$1 \cdot 4$	$3 \cdot \underline{-6}$	$1 \cdot \underline{-6} + 4 \cdot \underline{3} = \underline{6}$
$1 \cdot 4$	$-6 \cdot \underline{3}$	$1 \cdot \underline{3} + 4 \cdot \underline{-6} = \underline{-21}$
$1 \cdot 4$	$-3 \cdot \underline{6}$	$1 \cdot \underline{6} + 4 \cdot \underline{-3} = \underline{-6}$
$1 \cdot 4$	$6 \cdot \underline{-3}$	$1 \cdot \underline{-3} + 4 \cdot \underline{6} = \underline{21}$

$(x + \underline{6})(4x - \underline{3})$ Complete the factoring.

Check $(\underline{x + 6})(\underline{4x - 3}) = 4x^2 - \underline{3x} + \underline{24x} - \underline{18}$

$= 4x^2 + \underline{21x} - 18$

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SECTION 8A Ready To Go On? Quiz

8-1 Factors and Greatest Common Factors
Write the prime factorization of each number.

1. 84 $\underline{2^2 \cdot 3 \cdot 7}$

2. 60 $\underline{2^2 \cdot 3 \cdot 5}$

3. 150 $\underline{2 \cdot 3 \cdot 5^2}$

4. 66 $\underline{2 \cdot 3 \cdot 11}$

5. 72 $\underline{2^3 \cdot 3^2}$

6. 156 $\underline{2^2 \cdot 3 \cdot 13}$

Find the GCF of each pair of monomials.

7. $6x^4$ and $9x^2$ $\underline{3x^2}$

8. $25x^3$ and $20x^4$ $\underline{5x^3}$

9. -18 and $27c^5$ $\underline{9}$

10. $5a$ and $7c$ $\underline{1}$

11. Nichole is designing a quilt. She has cut out 60 red squares and 48 green squares. She plans for the quilt to have the same number of colored squares in each row, but, green and red squares will not be in the same row. How many rows will the quilt have if Nichole puts the greatest number of squares in each row? $\underline{9 \text{ rows}}$

8-2 Factoring by GCF
Factor each polynomial. Check your answer.

12. $30x^2 + 12x$ $\underline{6x(5x + 2)}$

13. $2a^2 - 10a^3$ $\underline{2a^2(1 - 5a)}$

14. $6x^4 - 15x^3 - 9x^2$ $\underline{3x^2(2x + 1)(x - 3)}$

15. $4x^2 + 12x + 16$ $\underline{4(x^2 + 3x + 4)}$

16. The surface area of a cylinder can be found using the expression $2\pi r^2 + 2\pi rh$, where r represents the radius of the cylinder and h represents the height.

Factor this expression. $\underline{2\pi r(r + h)}$



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SECTION 8A Ready To Go On? Quiz continued

Factor each polynomial by grouping. Check your answer.

17. $x^3 - 3x^2 + 2x - 6$ — $(x^2 + 2)(x - 3)$

18. $5x^3 + 10x^2 + x + 2$ — $(5x^2 + 1)(x + 2)$

19. $2r^3 - 8r^2 - 3r + 12$ — $(2r^2 - 3)(r - 4)$

20. $3s^3 - 12s^2 - s + 4$ — $(3s^2 - 1)(s - 4)$

21. $4y^3 + 16y^2 - 2y - 8$ — $(4y^2 - 2)(y + 4)$

22. $8b^3 + 16b^2 - 2b - 4$ — $(8b^2 - 2)(b + 2)$

8-3 Factoring $x^2 + bx + c$

Factor each trinomial. Check your answer.

23. $a^2 + 12a + 35$ — $(a + 5)(a + 7)$

24. $x^2 - 3x - 10$ — $(x - 5)(x + 2)$

25. $x^2 - 8x + 7$ — $(x - 1)(x - 7)$

26. $x^2 + 13x - 30$ — $(x + 15)(x - 2)$

27. $c^2 - 13c + 36$ — $(c - 9)(c - 4)$

28. $y^2 - 12y + 32$ — $(y - 8)(y - 4)$

29. Simplify and factor the polynomial $n(n + 7) + 12$. Show that the original polynomial and the factored form describe the same sequence of numbers for $n = 0, 1, 2, 3,$ and 4.

$n^2 + 7n + 12$; $(n + 3)(n + 4)$

8-4 Factoring $ax^2 + bx + c$

Factor each trinomial. Check your answer.

30. $2a^2 + 5a + 2$ — $(2a + 1)(a + 2)$

31. $6x^2 + 11x + 4$ — $(2x + 1)(3x + 4)$

32. $3x^2 - x - 10$ — $(3x + 5)(x - 2)$

33. $4x^2 - 14x + 12$ — $2(2x - 3)(x - 2)$

34. $6c^2 - 12c - 18$ — $6(c - 3)(c + 1)$

35. $12y^2 - y - 20$ — $(3y - 4)(4y + 5)$

36. The area of a rectangle is $(10x^2 + 21x + 9)$ cm^2. The length is $(5x + 3)$ cm. What is the width of the rectangle?

$(2x + 3)$ cm

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SECTION 8A Ready To Go On? Enrichment

Sum and Differences of Cubes

While it is possible to factor the sum and differences of two squares, it is also possible to factor the sum and differences of two cubes.

The sum of two cubes can be factored in the following way:

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

The differences of two cubes can be factored in the following way:

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

Factor each of the following.

1. $r^3 - s^3$ — $(r - s)(r^2 + rs + s^2)$

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

3. $x^3 + 8$ — $(x + 2)(x^2 - 2x + 4)$

4. $n^3 - 64$ — $(n - 4)(n^2 + 4n + 16)$

5. $8y^3 + 27$ — $(2y + 3)(4y^2 - 6y + 9)$

6. $pq^3 - 64p$ — $p(q - 4)(q^2 + 4q + 16)$

Express each of the following as the sum or difference of two cubes.

7. $(m - 1)(m^2 + m + 1)$ — $m^3 - 1$

8. $(2 + 3t)(4 - 6t + 9t^2)$ — $8 + 27t^3$

9. $(b - 64)(b^2 + 4b + 16)$ — $b^3 - 4^3$

10. $(x + 7)(x^2 - 7x + 49)$ — $x^3 + 7^3$

11. $(2y - 1)(4y^2 + 2y + 1)$ — $8y^3 - 1$

12. $(3 + 2t)(9 - 6t + 4t^2)$ — $27 + 8t^3$

13. $(s + 10)(s^2 - 10s + 100)$ — $s^3 + 1000$

14. $2(x - 4)(x^2 + 4x + 16)$ — $2x^3 - 128$

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SECTION 8B Ready To Go On? Skills Intervention

8-5 Factoring Special Products

Recognizing and Factoring Perfect-Square Trinomials

A trinomial is a perfect square if the first and the last terms are perfect squares. The middle term is two times one factor from the first term and one factor from the last term.

Determine whether each trinomial is a perfect square. If so, factor it. If not, explain why.

A. $x^2 + 14x + 42$

Method 1 Factor.

Factors of 42	Sum
1 and 42	43
2 and 21	23
3 and 14	17
6 and 7	13

Is $x^2 + 14x + 42$ a perfect square trinomial? No Why? No factors give the sum of 14.

B. $9x^2 - 24x + 16$

Method 2 Use the pattern.

$9x^2 - 24x + 16$

$3x \cdot 3x - 2(3x \cdot 4) + 4 \cdot 4$

The trinomial is a perfect square.

$a = 3x$, $b = 4$

$(3x)^2 - 2(3x)(4) + 4^2$ Write the trinomial as $a^2 - 2ab + b^2$.

$(3x - 4)^2$ Write as $(a - b)^2$.

Determine whether each binomial is the difference of two squares. If so, factor it. If not explain why.

A. $x^2 - 16$

$(x \cdot x) - (4 \cdot 4)$ The polynomial is the difference of two squares.

$a = x$, $b = 4$

$(x + 4)(x - 4)$ Write the polynomial as $(a + b)(a - b)$.

So $x^2 - 16 = (x + 4)(x - 4)$.

B. $9x^6 - 17y^2$

Is $9x^6$ a perfect square? Yes

Is $-17y^2$ a perfect square? No

Is $9x^6 - 17y^2$ the difference of two squares? No

Why? Because $-17y^2$ is not a perfect square.

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SECTION 8B Ready To Go On? Problem Solving Intervention

8-5 Factoring Special Products

If a trinomial is a perfect square, it can be factored to determine measurements of real-world objects.

A community garden, rectangular in shape, has an area of $(25x^2 + 20x + 4)$ ft^2. The dimensions of the garden are approximately $ax + b$, where a and b are whole numbers. Find an expression for the perimeter of the garden. Then find the perimeter where $x = 12$.

Understand the Problem

1. What is the shape of the garden? Rectangle

2. What is the area of the garden? $(25x^2 + 20x + 4)$ ft^2

3. What kind of numbers are a and b? Whole numbers

4. What are you being asked to find? The expression for the perimeter of the garden and the perimeter when $x = 12$.

Make a Plan

5. The formula for the area of a rectangle is: Area = length $\times$ width

6. What must be done to the trinomial to find the length and width? Factor it

Solve

7. Does the trinomial $25x^2 + 20x + 4$ have a common factor? No

8. Is $25x^2 + 20x + 4$ a perfect square trinomial? Yes So, $a = 5x$ and $b = 2$.

9. What are the factors of the perfect square trinomial? $(5x + 2)^2$

10. Since the length and width of the garden are equal, what is the actual shape of the garden? A square

11. The formula for the perimeter of a square is $P = 4s$.

a. What should you substitute in the perimeter formula for s? $5x + 2$

b. Simplify $4(5x + 2)$ to find an expression for the perimeter. $20x + 8$

12. Evaluate the expression when $x = 12$. What is the perimeter? 248 ft

Look Back

13. Using the perimeter from Exercise 12, what is the length of one side of the square? 62 ft Use this side length to find the area. 3844 ft^2

14. Evaluate $25x^2 + 20x + 4$ for $x = 12$: $25(12)^2 + 20(12) + 4 =$ 3844

15. Are the areas in Exercises 13 and 14 equal? Yes

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SECTION 8B Ready To Go On? Skills Intervention

8-6 Choosing a Factoring Method

Determining Whether a Polynomial Is Completely Factored
Tell whether each polynomial is completely factored. If not, factor it.

A. $4x^2 + 2x - 6 = 2(2x^2 + x - 3)$

The greatest common factor is 2.

Is $(2x^2 + x - 3)$ factorable? Yes

Is $2(2x^2 + x - 3)$ completely factored? No

Factor: $2(2x^2 + x - 3) \Rightarrow 2(2x + 3)(x - 1)$

B. $42x - 14x^3 = 14(3x - x^3)$

What is the greatest common factor? $14x$

Is the polynomial factored completely? No

Factor: $42x - 14x^3 \Rightarrow 14x(3 - x^2)$

Can the polynomial be factored any further? No

Factoring by Multiple Methods
Factor the polynomial $6x^3 + 21x^2 + 15x$ completely. Check your answer.

Consider $6x^3 + 21x^2 + 15x$.

What is the GCF? $3x$

Factor out the GCF: $3x(2x^2 + 7x + 5)$

What is the value of a? 2 What is the value of c? 5,

The Outer + Inner terms = 7.

Factors of 2	Factors of 5	Outer + Inner
$1 \cdot 2$	$5 \cdot 1$	$1 \cdot 1 + 2 \cdot 5 = 11$
$1 \cdot 2$	$1 \cdot 5$	$1 \cdot 5 + 2 \cdot 1 = 7$

Complete the binomial: $(x + 1)(2x + 5)$

Write as a factored polynomial: $3x(x + 1)(2x + 5)$

Check: $3x(x + 1)(2x + 5)$

$= 3x(2x^2 + 5x + 2x + 5)$ FOIL

$= 3x(2x^2 + 7x + 5)$ Combine like terms.

$= 6x^3 + 21x^2 + 15x$ Distribute the $3x$.

Is this the original polynomial? Yes

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SECTION 8B Ready To Go On? Quiz

8-5 Factoring Special Products

Determine whether each trinomial is a perfect square. If so, factor it. If not, explain why.

1. $a^2 + 6a + 9$ — Yes; $(a + 3)^2$

2. $16x^2 - 40x + 25$ — Yes; $(4x - 5)^2$

3. $w^2 - 12w + 4$ — No; $12w \neq 2(w)(2)$

4. $5y^2 - 14y + 16$ — 5 is not a perfect square.

5. $x^2 + 4x + 4$ — Yes; $(x + 2)^2$

6. $25h^2 - 70h + 49$ — Yes; $(5h - 7)^2$

7. An architect is designing rectangular windows with an area of $(x^2 + 22x + 121)$ ft^2. The dimensions of the windows are of the form $ax + b$, where a and b are whole numbers. Find an expression for the perimeter of the windows. Find the perimeter of a window when $x = 3$ ft.

$4(x + 11)$; 56 feet

Determine whether each trinomial is the difference of two squares. If so, factor it. If not, explain why.

8. $r^2 - 144$ — Yes; $(r - 12)(r + 12)$

9. $4a^2 - 30$ — 30 is not a perfect square.

10. $1 - 25a^4$ — Yes; $(1 - 5a^2)(1 + 5a^2)$

11. $36k^2 - 9k^6$ — Yes; $(6k - 3k^3)(6k + 3k^3)$

12. $49a^2 + 64$ — The terms are added.

13. $w^4 - a^2$ — Yes; $(w^2 - a)(w^2 + a)$

14. The area of a square is $(49x^2 - 28x + 4)$ in^2.

a. What is the length of a side of the square? $(7x - 2)$

b. What is the perimeter of the square? $4(7x - 2)$

c. What are the length of a side, the perimeter, and the area of the square when $x = 4$ in.? 26 in.; 104 in.; 676 in.^{2}

8-6 Choosing a Factoring Method

Tell whether each polynomial is completely factored. If not, factor it.

15. $7x^2 + 35x + 7 = 7(x^2 + 5x + 1)$ — Yes

16. $16x^3 - 24x^2 = 8x(2x^2 - 3x)$ — $8x^2(2x - 3)$

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SECTION 8B Ready To Go On? Quiz continued

17. $4x^5 - 16x = 4x(x^4 - 4)$ — $4x(x^2 - 2)(x^2 + 2)$

18. $3a^2 - 42a + 147 = 3(a^2 - 14a + 49)$ — $3(a - 7)(a - 7)$

19. $8y^3 - 8y^2 - 12y + 12 = 4(2y^2 - 3)(y - 1)$ — Yes

20. $3y^2 + 17y + 10 = (3y + 2)(y + 5)$ — Yes

Factor each polynomial completely. Check your answer.

21. $4x^3 - 24x^2 + 36x$ — $4x(x - 3)^2$

22. $3x^2y - 12xy^2$ — $3xy(x - 4y)$

23. $3a^2 + a + 1$ — Unfactorable

24. $12x^3 - 3x$ — $3x(2x + 1)(2x - 1)$

25. $4x^2 + 12x - 112$ — $4(x - 4)(x + 7)$

26. $x^5 - 16x$ — $x(x - 2)(x + 2)(x^2 + 4)$

Write an expression for each situation. Factor your expression.

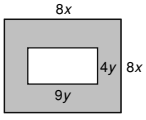
27. The difference of the square of a pipe's length and 49.
$\ell^2 - 49 = (\ell + 7)(\ell - 7)$

28. The square of Catherine's age plus 18 times Catherine's age plus 81.
$x^2 + 18x + 81 = (x + 9)^2$

29. Three times the square of a truck's speed minus three times the trucks speed plus 18.
$3x^2 - 3x + 18 = 3(x - 3)(x + 2)$

30. Four times the square of cherries on a tree minus 11 times the number of cherries minus 21.
$4x^2 - 11x - 21$; not factorable

31. Write an expression for the area of the shaded region. Then factor the expression.



$64x^2 - 36y^2 = 4(4x - 3y)(4x + 3y)$

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SECTION 8B Ready To Go On? Enrichment

Fourth Degree Trinomials
Sometimes it is possible to write a trinomial of the fourth degree, $a^4 + a^2b^2 + b^4$, as a difference of two squares and then factor.

Example: Factor $4a^4 - 21a^2b^2 + 9b^4$.

Step I Find the square roots of the first and last terms.

$\sqrt{4a^4} = 2a^2$ $\sqrt{9b^4} = 3b^2$

Step II Find twice the product of the square roots from the terms in Step 1.

$2(2a^2)(3b^2) = 12a^2b^2$

Step III Split the middle term of the trinomial into two parts. One part is either the answer from the Step II or its opposite. The other part should be the opposite of a perfect square.

$-21a^2b^2 = -12a^2b^2 - 9a^2b^2$

Step IV Rewrite the trinomial as the difference of two squares and then factor.

$4a^4 - 21a^2b^2 + 9b^4 = (4a^4 - 12a^2b^2 + 9b^4) - 9a^2b^2$

$= (2a^2 - 3b^2)^2 - 9a^2b^2$

$= [(2a^2 - 3b^2) - 3ab][(2a^2 - 3b^2) - 3ab]$

$= (2a^2 + 3ab - 3b^2)(2a^2 - 3ab - 3b^2)$

Factor each trinomial.

1. $16d^4 + 7d^2 + 1$ — $(4d^2 - d + 1)(4d^2 + d + 1)$

2. $p^4 + p^2 + 1$ — $(p^2 + p + 1)(p^2 - p + 1)$

3. $4x^4 - 13x^2 + 1$ — $(2x^2 + 3x - 1)(2x^2 - 3x - 1)$

4. $4x^4 - 9x^2y^2 + 16y^4$ — $(2x^2 - 5xy + 4y^2)(2x^2 + 5xy + 4y^2)$

5. $9r^4 + 26r^2s^2 + 25s^4$ — $(3r^2 + 2rs + 5s^2)(3r^2 - 2rs + 5s^2)$

6. $4a^4 - 5a^2c^2 + 25c^4$ — $(2a^2 - 5ac + 5c^2)(2a^2 + 5ac + 5c^2)$

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