

# 6.19

## Factoring the Difference of Two Fourth Powers

### • Example 1

Factor completely.

$$32x^2 - 2x^2y^4$$

First, we factor out the common factor of  $2x^2$ .

$$32x^2 - 2x^2y^4 = 2x^2(16 - y^4)$$

The expression  $16 - y^4$  has the form  $a^2 - b^2$  with  $a = 4$  and  $b = y^2$ . Rewriting, we have

$$\begin{aligned} 16 - y^4 &= 4^2 - (y^2)^2 \\ &= (4 + y^2)(4 - y^2) \end{aligned}$$

$4 - y^2$  is also the difference of two squares, so

$$\begin{aligned} 16 - y^4 &= (4 + y^2)(2^2 - y^2) \\ &= (4 + y^2)(2 + y)(2 - y) \end{aligned}$$

Thus,

$$32x^2 - 2x^2y^4 = 2x^2(4 + y^2)(2 + y)(2 - y)$$

### ● ● ● CHECK YOURSELF 1

Factor completely.

$$x^2y^4 - 81x^2$$

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### ● ● ● CHECK YOURSELF ANSWER

1.  $x^2(y^2 + 9)(y + 3)(y - 3)$ .

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# 6.19 Exercises

Name \_\_\_\_\_

Section \_\_\_\_\_

Date \_\_\_\_\_

## A N S W E R S

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

Factor completely.

1.  $x^4y - y$

2.  $7y^2 - 7y^2x^4$

3.  $10y^4 - 160$

4.  $3yx^4 - 243y$

5.  $2z^4 - 162$

6.  $x^5 - 16x$

7.  $3y^6 - 48y^2$

8.  $5x^2y^4 - 5x^6$