LESSON 5

Simplifying Square Roots

Review It! When you simplify square roots, remember this word:

factor a number (or term) that divides evenly into another number (or term)

$3 \times 4 = 12$ — 3 and 4 are factors of 12.

The square root of a product is the product of the square roots of the factors.

Simplify: $\sqrt{24}$

Step 1 List all the different factor pairs of 24.

THINK $2 \times ? = 24$

$1 \times 24, 2 \times$ _____, $3 \times 8, 4 \times 6$

The factors are 1, 2, 3, 4, 6, 8, _____, and 24.

Step 2 Choose the factor that is the greatest perfect square.

The greatest perfect square is _____.

REMEMBER A perfect square is an integer times itself.

Step 3 Simplify.

$\sqrt{24} = \sqrt{4 \times 6} = \sqrt{4} \times \sqrt{6} = 2\sqrt{6}$

THINK This is a perfect square.

So, $\sqrt{24} =$ _____.

Try It! List all the factors of each number.

Ask Yourself

1. 30 _____ 2. 99 _____ 3. 50 _____ 4. 18 _____

1. What is the greatest factor of 30? 15, or 30?

Find the factor that is the greatest perfect square.

5. 32 _____ 6. 75 _____ 7. 45 _____ 8. 28 _____

5. Which is a perfect square? 16, or 8?

Write each expression in simplest form.

9. $\sqrt{40}$ _____ 10. $\sqrt{50}$ _____

9. What factor is a perfect square? 2, 4, or 10?

13. $\sqrt{42}$ _____ 14. $\sqrt{8}$ _____

17. $\sqrt{32}$ 18. $\sqrt{75}$

Solve.

21. The length of a walkway is $\sqrt{27}$ feet. What is the simplest form of $\sqrt{27}$? _____

22. The side of a playground is $\sqrt{60}$ meters. What is the simplest form of $\sqrt{60}$? _____

21. What are the factors of 27? 10 and 17, or 9 and 3?

On Your Own!

Circle the best answer for each question.

Simplify each expression.

1. $\sqrt{200}$

   A. $2\sqrt{10}$
   B. $10\sqrt{2}$
   C. 50
   D. 100

2. $\sqrt{13}$

   A. $\sqrt{13}$
   B. $4\sqrt{2}$
   C. 6
   D. 6.5

3. $\sqrt{80}$

   A. 40
   B. $5\sqrt{4}$
   C. $4\sqrt{5}$
   D. $2\sqrt{20}$

4. $\sqrt{48}$

   A. 24
   B. $3\sqrt{16}$
   C. $2\sqrt{12}$
   D. $4\sqrt{3}$

5. $\sqrt{90}$

   A. $3\sqrt{10}$
   B. $2\sqrt{45}$
   C. $10\sqrt{3}$
   D. $45\sqrt{2}$

6. $\sqrt{44}$

   A. $11\sqrt{4}$
   B. $11\sqrt{2}$
   C. $4\sqrt{11}$
   D. $2\sqrt{11}$

7. The length of the side of a square field is $\sqrt{300}$ ft. What is the simplest form for the length?

   A. $3\sqrt{10}$ ft
   B. $10\sqrt{3}$ ft
   C. 150 ft
   D. 900 ft

8. The length of the side of a square playground is $\sqrt{288}$ ft. What is the simplest form for the length?

   A. 144 ft
   B. $12\sqrt{2}$ ft
   C. 12 ft
   D. $2\sqrt{12}$ ft

Number and Operations

9. **Part A** Simplify each expression.

   $\sqrt{250}$ $2\sqrt{90}$

   _____; _____

   Part B Which expression has the greater value?

   _____

10. **Part A** Simplify each expression.

    $\sqrt{180}$ $3\sqrt{45}$

    _____; _____

    Part B Which expression has the greater value?

    _____

Math Words

Fill in the blanks.

11. 9 and 8 are _____ of 72.

12. 81 is a _____ _____.

13. A number that divides evenly into another number is a _____.