

LESSON

7

Multiplying and Dividing Square Roots

Review It!

When you multiply and divide expressions with square roots, remember this word:

radicand number under the radical sign

$4\sqrt{18}$ ← 18 is the radicand.

Example 1 Multiply radicals to find the product: $3\sqrt{2} \times 4\sqrt{5}$

Step 1 Multiply. Multiply the radicands separately.

$3 \times 4 = \underline{\hspace{2cm}}$

$\sqrt{2} \times \sqrt{5} = \sqrt{2 \times 5} = \underline{\hspace{2cm}}$

Step 2 Multiply the products.

$12 \times \sqrt{10} = \underline{\hspace{2cm}}$

So, $3\sqrt{2} \times 4\sqrt{5} = \underline{\hspace{2cm}}$.

Example 2 Divide radicals to find the quotient: $\frac{15\sqrt{10}}{3\sqrt{5}}$

Step 1 Divide. Divide the radicands separately.

$\frac{15}{3} \times \sqrt{\frac{10}{5}} = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}}$

Step 2 Simplify.

$\underline{\hspace{2cm}} \times \sqrt{2} = 5\sqrt{2}$

So, $\frac{15\sqrt{10}}{3\sqrt{5}} = \underline{\hspace{2cm}}$.

REMEMBER Multiply the quotients.

Try It!

Multiply.

1. $3\sqrt{5} \times 4\sqrt{7}$ 2. $8\sqrt{2} \times 6\sqrt{3}$

Multiply. Simplify the answer.

3. $6\sqrt{8} \times 3\sqrt{6}$ 4. $9\sqrt{3} \times 5\sqrt{6}$

5. $5\sqrt{5} \times 9\sqrt{15}$ 6. $12\sqrt{21} \times 3\sqrt{7}$

Divide.

7. $\frac{12\sqrt{15}}{6\sqrt{5}}$ 8. $\frac{20\sqrt{18}}{4\sqrt{9}}$

9. $\frac{34\sqrt{20}}{2\sqrt{10}}$ 10. $\frac{42\sqrt{30}}{7\sqrt{6}}$

Solve.

11. The product of two numbers is $6\sqrt{15}$. One of the numbers is $2\sqrt{3}$. What is the other number? _____

12. The quotient of two numbers is $4\sqrt{7}$. The lesser number is $3\sqrt{3}$. What is the greater number? _____

Ask Yourself

1.

What are the radicands?
3 and 4, or 5 and 7?

3.

What is the greatest perfect-square factor of 48?
4, or 16?

7.

What are the radicands?
12 and 6, or 15 and 5?

11.

What do you find?
 $6\sqrt{15} \times 2\sqrt{3}$, or
 $6\sqrt{15} \div 2\sqrt{3}$?

On Your Own!

Circle the best answer for each question.

- Multiply: $4\sqrt{7} \times 11\sqrt{3}$
 - $44\sqrt{21}$
 - $44\sqrt{10}$
 - $15\sqrt{21}$
 - $15\sqrt{10}$
- Multiply: $9\sqrt{2} \times 3\sqrt{13}$
 - $12\sqrt{15}$
 - $12\sqrt{26}$
 - $27\sqrt{15}$
 - $27\sqrt{26}$
- Simplify: $\frac{24\sqrt{26}}{8\sqrt{2}}$
 - $6\sqrt{6}$
 - $3\sqrt{24}$
 - $3\sqrt{13}$
 - $6\sqrt{2}$
- Simplify: $\frac{50\sqrt{40}}{5\sqrt{8}}$
 - $45\sqrt{32}$
 - $10\sqrt{32}$
 - $45\sqrt{5}$
 - $10\sqrt{5}$
- Multiply: $2\sqrt{12} \times 5\sqrt{5}$
 - $150\sqrt{4}$
 - $20\sqrt{30}$
 - $20\sqrt{15}$
 - $10\sqrt{17}$
- Multiply: $4\sqrt{9} \times 3\sqrt{20}$
 - $12\sqrt{29}$
 - $72\sqrt{5}$
 - 360
 - $108\sqrt{20}$
- The product of two numbers is $15\sqrt{3}$. One of the numbers is $\sqrt{15}$. What is the other number?
 - $\sqrt{5}$
 - $3\sqrt{3}$
 - $3\sqrt{5}$
 - $10\sqrt{3}$
- The quotient of two numbers is $7\sqrt{3}$. The greater number is $21\sqrt{21}$. What is the lesser number?
 - $3\sqrt{7}$
 - $14\sqrt{7}$
 - $14\sqrt{18}$
 - $441\sqrt{7}$

9. Find the value: $\frac{25\sqrt{50}}{5\sqrt{15}} \times \frac{6\sqrt{6}}{10\sqrt{20}}$

10. Find the value: $\frac{10\sqrt{18}}{3\sqrt{5}} \times \frac{\sqrt{5}}{5}$

Math Words

Fill in the blanks.

- The answer to a division problem is the _____.
- The answer to a multiplication problem is the _____.
- A number that divides evenly into another number is a _____.
- The number under the square root sign is the _____.