Lesson 4: Simplifying Square Roots

Classwork

Opening Exercises 1–6

1.

a. What does $\sqrt{16}$ equal?

b. What does 4×4 equal?

c. Does $\sqrt{16} = \sqrt{4 \times 4}$?

2.

a. What does $\sqrt{36}$ equal?

b. What does 6×6 equal?

c. Does $\sqrt{36} = \sqrt{6 \times 6}$?

3.

a. What does $\sqrt{121}$ equal?

b. What does 11×11 equal?

c. Does $\sqrt{121} = \sqrt{11 \times 11}$?

4.

a. What does $\sqrt{81}$ equal?

b. What does 9×9 equal?

c. Does $\sqrt{81} = \sqrt{9 \times 9}$?

5. What is another way to write $\sqrt{20}$?

6. What is another way to write $\sqrt{28}$?

Example 1

Simplify the square root as much as possible.

$\sqrt{50} =$

Example 2

Simplify the square root as much as possible.

$\sqrt{28} =$

Exercises 7–10

Simplify the square roots as much as possible.

7. $\sqrt{18}$

8. $\sqrt{44}$

9. $\sqrt{169}$

10. $\sqrt{75}$

Example 3

Simplify the square root as much as possible.

$\sqrt{128} =$

Example 4

Simplify the square root as much as possible.

$\sqrt{288} =$

Exercises 11–14

11. Simplify $\sqrt{108}$.

12. Simplify $\sqrt{250}$.

13. Simplify $\sqrt{200}$.

14. Simplify $\sqrt{504}$.

Lesson Summary

Square roots of non-perfect squares can be simplified by using the factors of the number. Any perfect square factors of a number can be simplified.

For example:

$$\begin{aligned}\sqrt{72} &= \sqrt{36 \times 2} \\ &= \sqrt{36} \times \sqrt{2} \\ &= \sqrt{6^2} \times \sqrt{2} \\ &= 6 \times \sqrt{2} \\ &= 6\sqrt{2}\end{aligned}$$

Problem Set

Simplify each of the square roots in Problems 1–5 as much as possible.

1. $\sqrt{98}$

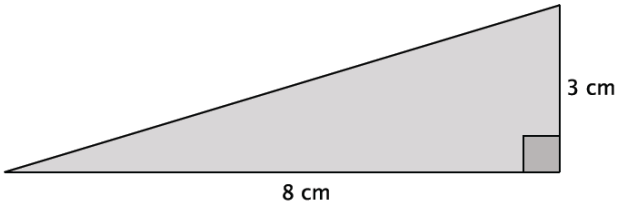
2. $\sqrt{54}$

3. $\sqrt{144}$

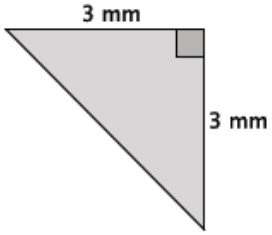
4. $\sqrt{512}$

5. $\sqrt{756}$

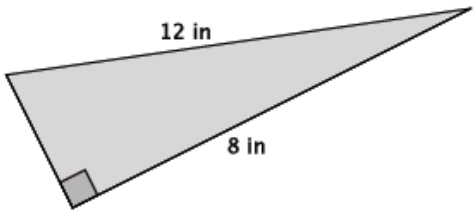
6. What is the length of the unknown side of the right triangle? Simplify your answer.



7. What is the length of the unknown side of the right triangle? Simplify your answer.



8. What is the length of the unknown side of the right triangle? Simplify your answer.



9. Josue simplified $\sqrt{450}$ as $15\sqrt{2}$. Is he correct? Explain why or why not.

10. Tiah was absent from school the day that you learned how to simplify a square root. Using $\sqrt{360}$, write Tiah an explanation for simplifying square roots.