

$$\sqrt{20} \approx 4.4$$

$$4^2 = 16$$

$$5^2 = 25$$

$$\sqrt{80} \approx 8.9$$

$$\sqrt{82} \approx 9.1$$

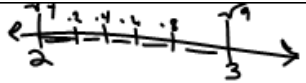
$$\sqrt{10} \approx 3.2$$

$$\sqrt{8} \approx 2.9$$

$$\sqrt{24} \approx 4.9$$

$$\sqrt{70} \approx \underline{8.3}$$

$$\sqrt{11} \approx 3.2$$



$$\sqrt{5} \approx 2.2$$

$$\sqrt{82} \approx 9.1$$

$$\sqrt{5} \approx 2.2$$

$$3 + \sqrt{5}$$

$$3 + (2.2) \approx 5.2$$

$$\sqrt{10} \approx \underline{3.2}$$

$$4 + \sqrt{10} \approx \square$$

$$4 + 3.2 \approx \boxed{7.2}$$

$$\sqrt{20} \approx$$

-

1, 4, 9, 16, 25, 36, 49, 64, 81, 100

Lesson 4: Simplifying Square Roots

* Look for a perfect square factor to take out. *

Classwork

Opening Exercise

a.

i. What does $\sqrt{16}$ equal?ii. What does 4×4 equal?iii. Does $\sqrt{16} = \sqrt{4 \times 4}$?

c.

i. What does $\sqrt{121}$ equal?ii. What does 11×11 equal?iii. Does $\sqrt{121} = \sqrt{11 \times 11}$?e. Rewrite $\sqrt{20}$ using at least one perfect square factor.

$$\begin{aligned}\sqrt{20} &= \sqrt{4 \times 5} \\ &= 2\sqrt{5}\end{aligned}$$

b.

i. What does $\sqrt{36}$ equal?ii. What does 6×6 equal?iii. Does $\sqrt{36} = \sqrt{6 \times 6}$?

d.

i. What does $\sqrt{81}$ equal?ii. What does 9×9 equal?iii. Does $\sqrt{81} = \sqrt{9 \times 9}$?f. Rewrite $\sqrt{28}$ using at least one perfect square factor.

$$\begin{aligned}\sqrt{28} &= \sqrt{4 \times 7} \\ &= 2\sqrt{7}\end{aligned}$$

1, 4, 9, 16, 25, 36, 49, 64, 81, 100

Example 1

Simplify the square root as much as possible.

$$\begin{aligned}\sqrt{50} &= \sqrt{25 \times 2} \\ &= 5\sqrt{2}\end{aligned}$$

Example 2

Simplify the square root as much as possible.

$$\begin{aligned}\sqrt{28} &= \sqrt{4 \times 7} \\ &= 2\sqrt{7}\end{aligned}$$

Exercises 1–4

Simplify the square roots as much as possible.

$$\begin{aligned}1. \sqrt{18} &= \sqrt{9 \times 2} \\ &= 3\sqrt{2}\end{aligned}$$

$$\begin{aligned}2. \sqrt{44} &= \sqrt{4 \times 11} \\ &= 2\sqrt{11}\end{aligned}$$

$$3. \sqrt{169} = 13$$

$$\begin{aligned}4. \sqrt{75} &= \sqrt{25 \times 3} \\ &= 5\sqrt{3}\end{aligned}$$

$$\sqrt{300} = \sqrt{100 \times 3}$$

A. ≈ 17.2

B. ≈ 9.3

C. $3\sqrt{10}$

D. 150

E. $10\sqrt{3}$

$$= 10\sqrt{3}$$

$$\approx 10(1.7)$$

$$\approx 17$$

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 5–8

5. Simplify $\sqrt{108}$.

6. Simplify $\sqrt{250}$.

7. Simplify $\sqrt{200}$.

8. Simplify $\sqrt{504}$.

Lesson Summary

Square roots of some 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. $\sqrt{98}$

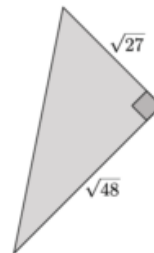
2. $\sqrt{54}$

3. $\sqrt{144}$

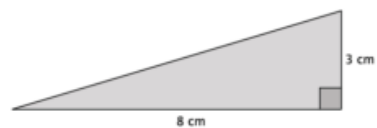
4. $\sqrt{512}$

5. $\sqrt{756}$

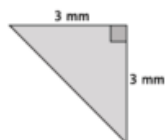
6. What is the length of the unknown side of the right triangle? Simplify your answer, if possible.



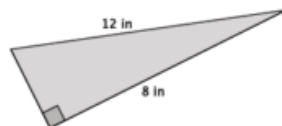
7. What is the length of the unknown side of the right triangle? Simplify your answer, if possible.



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



9. What is the length of the unknown side of the right triangle? Simplify your answer, if possible.



10. Josue simplified $\sqrt{450}$ as $15\sqrt{2}$. Is he correct? Explain why or why not.
11. 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.