Section 11.R.5 Evaluating Radicals

Go to Section 11.R.5 Learn mode in Hawkes to follow along!

Square Roots

Radical Terminology

The symbol $\sqrt{\ }$ is called _____.

The number under the _____.

The complete expression, such as $\sqrt{64}$, is called

_____.

Square Root

If a is a nonnegative real number, then

_____,

and

_____.

Example 1 Evaluating Square Roots

Evaluate the following square roots.

a. $\sqrt{36}$

b. $\sqrt{121}$

c. $\sqrt{0}$

d. $\sqrt{-25}$

Solution

Exercises

Simplify the following square roots and cube roots.

1. $\sqrt{9}$

2. $\sqrt{169}$

3. $\sqrt{\frac{9}{16}}$

4. $\sqrt{0.0081}$

5. $-\sqrt{100}$

6. $-\sqrt{144}$

Estimates (rounded to the nearest ten-thousandth) of radicals are given. Show that these are reasonable estimates.

7. $\sqrt{74} \approx 8.6023$

8. $\sqrt{32} \approx 5.6569$

Simplifying Square Roots

Properties of Square Roots

If a and b are **positive** real numbers, then

1. _____

2. _____

Simplest Form for Square Roots

A square root is considered to be in **simplest form** when

_____.

Example 4 Simplifying Radical Expressions

Simplify each expression so that there are no perfect square factors in the radicand.

a. $\sqrt{48}$ **b.** $\sqrt{63}$ **c.** $\sqrt{\frac{75}{16}}$

Solution

Exercises

Simplify each of the following radical expressions.

9. $\sqrt{12}$ **11.** $\sqrt{288}$ **13.** $-\sqrt{\frac{125}{100}}$

10. $-\sqrt{45}$ **12.** $-\sqrt{63}$ **14.** $\sqrt{\frac{147}{100}}$

Using a Calculator to Evaluate Radical Expressions

Example 5 Evaluating Radical Expressions with a Calculator

The following radical expressions are evaluated by using a TI-84 Plus graphing calculator. In each example, the steps (or keys to press) are shown. The TI-84 Plus gives answers rounded to nine decimal places. You may choose (through the MODE key) to have answers rounded to fewer than nine places.

a. $\sqrt{17}$

b. $3\sqrt{20}$

Solution

Exercises

Use a calculator to find the value of each radical expression rounded to the nearest ten-thousandth.

15. $\sqrt{39}$

16. $\sqrt{6.23}$

17. $\sqrt{\frac{1}{5}}$

18. $-3\sqrt{6}$