Section 9.2 and 9.4

Simplifying Square Roots and Rationalizing Denominators

# Objective 1: Simplifying Square Roots Using the Product Rule

A square root is simplified when the radicand contains no perfect square factors other than . For example, is not simplified because and is a perfect square.

**Product Rule for Square Roots:**

If and are real numbers, then

.

Applying this rule, we can simplify as follows:

Simplify.

|  |  |
| --- | --- |
| a. | b. |
| c. |  |

# Objective 2: Simplifying Square Roots Using the Quotient Rule

Next, we will examine the square root of a quotient.

**Quotient Rule for Square Roots:**

If and are real numbers and , then

.

Simplify.

|  |  |
| --- | --- |
| a. | b. |

# Objective 3: Rationalizing Denominators

It is sometimes easier to work with a radical expression if the denominator does not contain a radical. Rewriting a radical expression to eliminate a radical in the denominator is called **rationalizing** the denominator.

For example, the expression has an irrational numerator and denominator. We can rationalize the denominator as follows:

The expression is numerically equivalent to the original expression but has a rational denominator.

Rationalize the denominator and simplify.

|  |  |
| --- | --- |
| a. | b. |