Section 8.5 Rationalizing Denominators and Numerators of Radical Expressions

# Objective 1: Rationalizing Denominators of Radical Expressions

When working with radical expressions such as , it is sometimes useful to write the expression either without a radical in the denominator or without a radical in the numerator.

The process for writing a radical expression as an equivalent expression but without a radical in the denominator is called **rationalizing the denominator** because our goal is to rewrite the expression so that the denominator is a rational number. For example, for the expression we can rationalize the denominator by multiplying both the numerator and the denominator by .

Rationalize the denominator. Assume that all variables represent positive real numbers. Give answers in simplest form.

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

|  |  |
| --- | --- |
| c. | d. |

|  |  |
| --- | --- |
| e. | f. |

# Objective 2: Rationalizing Denominators Having Two Terms

Recall the difference of squares identity from Chapter 6.

The expressions and are called **conjugates** of each other. To rationalize a numerator or denominator that contain a radical expression that is the sum or difference of two terms, we use conjugates and the difference of squares identity.

For example, the conjugate of is . We can rationalize the denominator of the expression by multiplying both the numerator and the denominator by .

Rationalize the denominator. Assume that all variables represent positive real numbers. Give answers in simplest form.

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

|  |  |
| --- | --- |
| c. |  |

# Objective 3: Rationalizing Numerators

The process for writing a radical expression as an equivalent expression but without a radical in the numerator is called **rationalizing the numerator** because our goal is to rewrite the expression so that the numerator is a rational number. For example, for the expression we can rationalize the numerator by multiplying both the numerator and the denominator by .

Rationalize the numerator. Assume that all variables represent positive real numbers. Give answers in simplest form.

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

|  |  |
| --- | --- |
| c. |  |