Dividing Radical Expressions

2 Quotient Property of Square Roots To divide square roots and simplify radical expressions, you can use the Quotient Property of Square Roots.

KeyConcept Quotient Property of Square Roots

Words	For any real numbers a and b, where $a \geq 0$ and $b > 0$, the square root of $\frac{a}{b}$ is equal to the square root of a divided by the square root of b.
Symbols	$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$

You can use the properties of square roots to **rationalize the denominator** of a fraction with a radical. This involves multiplying the numerator and denominator by a factor that eliminates radicals in the denominator.

Simplify $\frac{\sqrt{6y}}{\sqrt{12}}$.

$$\frac{6}{\sqrt{2}}$$

$$\frac{15}{\sqrt{5}}$$

$$\frac{4}{\sqrt{20}}$$

Binomials of the form $a\sqrt{b} + c\sqrt{d}$ and $a\sqrt{b} - c\sqrt{d}$, where a, b, c, and d are rational numbers, are called **conjugates**. For example, $2 + \sqrt{7}$ and $2 - \sqrt{7}$ are conjugates. The product of two conjugates is a rational number and can be found using the pattern for the difference of squares.

Simplify $\dfrac{3}{5 + \sqrt{2}}$.

$$\frac{3}{3+\sqrt{5}}$$

$$\frac{2}{1-\sqrt{10}}$$