

Rational Exponents, Radicals, and Complex Numbers

Radicals with the same index and the same radicand are **like radicals**.

The distributive property can be used to add like radicals.

Radical expressions are multiplied by using many of the same properties used to multiply polynomials.

The conjugate of $a + b$ is $a - b$.

The process of writing the denominator of a radical expression without a radical is called **rationalizing the denominator**.

The process of writing the numerator of a radical expression without a radical is called **rationalizing the numerator**.

Radical Equations and Problem Solving

To solve a radical equation:

1. Write the equation so that one radical is by itself on one side of the equation.
2. Raise each side of the equation to a power equal to the index of the radical.
3. Simplify each side of the equation.
4. If the equation still contains a radical, repeat steps 1 through 3.
5. Solve the equation.
6. Check proposed solutions in the original equation for extraneous solutions.

Complex Numbers

A complex number is a number that can be written in the form $a + bi$, where a and b are real numbers.

$$i^2 = -1 \text{ and } i = \sqrt{-1}$$

To add or subtract complex numbers, add or subtract their real parts and then add or subtract their imaginary parts.

To multiply complex numbers, multiply as though they are binomials.

The complex numbers $(a + bi)$ and $(a - bi)$ are called **complex conjugates**.

To divide complex numbers, multiply the numerator and the denominator by the conjugate of the denominator.