Caution! Currently, square roots are defined differently in different textbooks. In conversations about mathematics, approach the concept with caution and first make sure that everyone in the conversation uses the same definition of square roots

Definition: Let N be a non-negative number. Then the **square root of** N (notation: $\sqrt{N}$) is the non-negative number that, if we square, the result is N. If N is negative, then $\sqrt{N}$ is undefined.

For example, $\sqrt{25} = 5$. On the other hand, $\sqrt{-25}$ is undefined.

Example 1 Evaluate each of the given numerical expressions.

a) $\sqrt{49}$ b) $-\sqrt{49}$ c) $\sqrt{-49}$ d) $-\sqrt{-49}$

Solution: a) $\sqrt{49} = \boxed{7}$

b) $-\sqrt{49} = \boxed{-7}$

c) $\sqrt{-49} = \boxed{\text{undefined}}$

d) $-\sqrt{-49} = \boxed{\text{undefined}}$

Square roots, when stretched over entire expressions, also serve as grouping symbols.

Example 2 Evaluate each of the following expressions.

a) $\sqrt{25} - \sqrt{16}$ b) $\sqrt{25 - 16}$ c) $\sqrt{144 + 25}$ d) $\sqrt{144} + \sqrt{25}$

Solution: a) $\sqrt{25} - \sqrt{16} = 5 - 4 = \boxed{1}$

b) $\sqrt{25 - 16} = \sqrt{9} = \boxed{3}$

c) $\sqrt{144 + 25} = \sqrt{169} = \boxed{13}$

d) $\sqrt{144} + \sqrt{25} = 12 + 5 = \boxed{17}$

