



3. the cube root of x plus the cube root of x plus y end root plus z end root

$$\sqrt[3]{x} + \sqrt[3]{x+y} + z$$

## Activity Time for Nested Radical Expressions

Write the radical expressions from Examples 1 to 3.

1. the square root of two plus the square root of three end root end root
2. the square root of two plus the square root of three plus the square root of four end root end root end root
3. the cube root of x plus the cube root of x plus y end root plus z end root

## Basic Rules for Simplifying Nested Radicals

Follow the same conventions for reading and spacing as we did in Lessons 1 to 5 and the basic rules for writing nested radical expressions. When we take a square root of something that is squared, the result is an **absolute value**. The vertical bar (dots 1-2-5-6) is used to represent absolute value and should be placed before and after the expression.

## Examples of Simplifying Nested Radicals

1. The square root of open parenthesis two minus the square root of five end root close parenthesis squared end root equals open absolute value two minus the square root of 5 end root close absolute value equals the square root of five end root minus two.

$$\sqrt{(2 - \sqrt{5})^2} = |2 - \sqrt{5}| = \sqrt{5} - 2$$

2. The square root of the cube root of  $x$  end root end root equals the cube root of the square root of  $x$  end root end root equals the sixth root of  $x$  end root.

$$\sqrt{\sqrt[3]{X}} = \sqrt[3]{\sqrt{X}} = \sqrt[6]{X}$$

The figure consists of 12 diagrams, each showing a pattern of black dots on a grid. The diagrams are arranged in two rows of six. The top row shows a progression from a small cluster of dots to a larger, more complex shape. The bottom row shows a progression from a small cluster of dots to a larger, more complex shape. The diagrams are labeled 1 through 12.

3. The square root of open fraction the square root of one hundred end root over four close fraction end root equals open fraction the square root of ten end root over the square root of four end root close fraction equals open fraction the square root of ten end root over two close fraction.

$$\sqrt{\frac{\sqrt{100}}{4}} = \frac{\sqrt{10}}{\sqrt{4}} = \frac{\sqrt{10}}{2}$$

## Activity Time for Simplifying Nested Radicals

Write the problems from Examples 1 to 3.

1. The square root of open parenthesis two minus the square root of five end root close parenthesis squared end root equals open absolute value two minus the square root of 5 end root close absolute value equals the square root of five end root minus two.
2. The square root of the cube root of x end root end root equals the cube root of the square root of x end root end root equals the sixth root of x end root.
3. The square root of open fraction the square root of one hundred end root over four close fraction end root equals open fraction the square root of ten end root over the square root of four end root close fraction equals open fraction the square root of ten end root over two close fraction.