

SQUARE ROOT

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Introduction



In Math, there is always an "opposite" operation! The opposite operation for "squaring" a number is taking the "square root". '√' this symbol represents "square root".

What is squaring a number?

Term for raising a number to the 2nd power is "squaring a number".

For example:

$2^2 = 4$. This can be read as 2 "squared" equals 4. This means that $2 \times 2 = 4$.

And as we said earlier that [square root](#) is the opposite of squaring a number, so,

$$\sqrt{4} = 2$$

The following examples help us in understanding the concept better:

$$1. \ 3^2 = 9 \qquad \text{OPPOSITE IS} \qquad \sqrt{9} = 3$$

3 squared is 9 The Square root of 9 is 3

$$2. \ 4^2 = 16 \qquad \text{OPPOSITE IS} \qquad \sqrt{16} = 4$$

4 squared is 16 The Square root of 16 is 4

Try This:

- | | |
|-----------------|--------------|
| 1. $\sqrt{25}$ | (Answer: 5) |
| 2. $\sqrt{121}$ | (Answer: 11) |
| 3. $\sqrt{625}$ | (Answer: 25) |

Properties of Square Roots

1. [Multiplication property](#) for square root expression:

The product of two square roots with different numbers inside can be written in a single root with the product of those two numbers.

$$\sqrt{a \times b} = \sqrt{a \times b}$$

For example:

$$\sqrt{16 \times 25} = \sqrt{16 \times 25}$$

$$4 \times 5 = \sqrt{400}$$

$$20 = 20$$

2. Square of the number property:

When a number gets into the square root, it turns into a square of the number.

$$\sqrt{a \times b} = \sqrt{a^2 \times b}$$

For example:

$$\sqrt{2 \times 25} = \sqrt{2^2 \times 25}$$

$$2 \times 5 = \sqrt{4 \times 25}$$

$$10 = \sqrt{100}$$

$$10 = 10$$

3. The [square root of a fraction](#) can be written as individual roots.

$$\sqrt{a/b} = \sqrt{a} / \sqrt{b}$$

For example:

$$\sqrt{25/16} = \sqrt{25} / \sqrt{16}$$

$$5/4 = 5/4$$

4. When a [perfect square](#) comes out of the root, it becomes the number without square.

$$\sqrt{a^2 b} = a \times \sqrt{b}$$

For example:

$$\sqrt{16 \times 3} = \sqrt{4^2 \times 3}$$

$$4 \sqrt{3}$$

5. Addition and subtraction property

$$\sqrt{a + b} \neq \sqrt{a} + \sqrt{b}$$

$$\sqrt{16 + 25} \neq \sqrt{16 + 25}$$

$$4 + 5 \neq \sqrt{41}$$

$$9 \neq \sqrt{41}$$

Similarly, $\sqrt{a - b} \neq \sqrt{a} - \sqrt{b}$

$$\sqrt{16 - 25} \neq \sqrt{16 - 25}$$

$$4 - 5 \neq \sqrt{-9}$$

$$-1 \neq \sqrt{-9}$$

Try the following questions:

$$1. \sqrt{121 x^4 w^6 m^8}$$

$$(\text{Answer: } 11 x^2 w^3 m^4)$$

2. ?(9/25)

(Answer: 3/5)

Now try it yourself! Should you still need any help, [click here](#) to schedule live online session with e Tutor!

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Reference Links:

- http://en.wikipedia.org/wiki/Square_root
- <http://cnx.org/content/m21975/latest/>
- http://en.wikipedia.org/wiki/Square_root#Properties
- <http://www.funtrivia.com/askft/Question100546.html>
- http://en.wikipedia.org/wiki/Perfect_square

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