**Squares and Square Roots**

**How to Square A Number**

To square a number, just multiply it by itself ...

**Example: What is 3 squared?**

|  |  |  |  |
| --- | --- | --- | --- |
| 3 Squared | = | http://www.mathsisfun.com/images/powers-square.gif | = 3 × 3 = **9** |

"Squared" is often written as a little 2 like this:


This says ***"4 Squared equals 16"***
(the little 2 says the number appears twice in multiplying)

**Squares From 12 to 62**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 1 Squared | = | 12 | = | 1 × 1 | = | **1** |
| 2 Squared | = | 22 | = | 2 × 2 | = | **4** |
| 3 Squared | = | 32 | = | 3 × 3 | = | **9** |
| 4 Squared | = | 42 | = | 4 × 4 | = | **16** |
| 5 Squared | = | 52 | = | 5 × 5 | = | **25** |
| 6 Squared | = | 62 | = | 6 × 6 | = | **36** |

**Square Roots**

A **square root** goes the other way:



3 squared is 9, so a **square root of 9 is 3**

A square root of a number is ...

... a value that can be **multiplied by itself** to give the original number.

A square root of **9** is ...

... **3**, because **when 3 is multiplied by itself** you get **9**.

It is like asking:

What can I multiply by itself to get this?

|  |  |
| --- | --- |
| tree root | **To help you remember** think of the root of a tree: *"I know the tree, but what is the root that produced it?*"In this case the tree is "9", and the root is "3". |

√9 = 3

Because $3^{2}$ = 9

**The Square Root Symbol**

|  |  |
| --- | --- |
| radical symbol | This is the special symbol that means "square root", it is sort of like a tick, and actually started hundreds of years ago as a dot with a flick upwards.It is called the ***radical***, and always makes math look important! |

You can use it like this:


you would say ***"square root of 9 equals 3"***

**Example: What is √25?**

Well, we just happen to know that 25 = 5 × 5, so if you multiply 5 by itself (5 × 5) you will get 25.

**So the answer is:**

√25 = 5

**Example: What is √36 ?**

Answer: 6 × 6 = 36, so **√36 = 6**

**Perfect Squares**

The perfect squares are the squares of the [whole numbers](http://www.mathsisfun.com/whole-numbers.html):

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | etc |
| **Perfect Squares:** | **1** | **4** | **9** | **16** | **25** | **36** | **49** | **64** | **81** | **100** | **121** | **144** | **169** | **196** | **225** | **...** |

**Calculating Square Roots**

If the square root is NOT one of the perfect squares, you must determine the two consecutive numbers that it falls between.

**Example: what is √10?**

Well, 3 × 3 = 9 and 4 × 4 = 16, so the square root is between 3 and 4.

 *Note: numbers like that are called* [*Irrational Numbers*](http://www.mathsisfun.com/irrational-numbers.html)*, if you want to know more.*