

Finding Square Roots

A number multiplied with itself is called a square of the number.

Ex. $2 \times 2 = 2^2$, $3 \times 3 = 3^2$, $4 \times 4 = 4^2$, $\pi \times \pi = \pi^2$

The number being multiplied is called the square root of the square. A square root is denoted by the symbol $\sqrt{\quad}$ (or $\sqrt[2]{\quad}$). Most square roots are not integers. We can find square roots using long division and multiplication. In order for division to give a correct answer, the divisor must equal the quotient.

Ex. $\sqrt{9} = ?$

$$\begin{array}{r} 3 \\ 3 \overline{)9} \\ \underline{-9} \\ 0 \end{array}$$

Ex. $\sqrt{2} = ?$ not the same

$$\begin{array}{r} 1 \\ 1 \overline{)2} \\ \underline{-2} \\ 0 \end{array}$$

$\begin{array}{r} 1.3\bar{3} \\ 1.5 \overline{)2.00} \\ \underline{-1.5} \\ 50 \\ \underline{-45} \\ 5 \end{array}$	try again	$\begin{array}{r} 1.428 \\ 1.4 \overline{)2.000} \\ \underline{-1.4} \\ 60 \\ \underline{-56} \\ 40 \\ \underline{-28} \end{array}$	try again	$\begin{array}{r} 1.418 \\ 1.41 \overline{)2.000} \\ \underline{-1.41} \\ 590 \end{array}$
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(My calculator approximates $\sqrt{2} \approx 1.414213562\dots$)

So through trial and error calculations, we can reach more accurate approximations for numbers (such as square roots) that are irrational (represented by decimals that neither repeat nor end). Engineers, carpenters, architects, scientists, and others who need practical use of such numbers as $\sqrt{2}$ use approximations.

Exercises: Find the square root of the number indicated.

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| 1.) 3 | 13.) 17 |
| 2.) 5 | 14.) 18 |
| 3.) 6 | 15.) 19 |
| 4.) 7 | 16.) 20 |
| 5.) 8 | 17.) 21 |
| 6.) 10 | 18.) 22 |
| 7.) 11 | 19.) 23 |
| 8.) 12 | 20.) 24 |
| 9.) 13 | 21.) 25 |
| 10.) 14 | |
| 11.) 15 | |
| 12.) 16 | |