

Square and Cube Roots

Square roots are inverses of squaring a number. Example: $4^2 = 16$, so $\sqrt{16} = 4$

When you are trying to find a square root, ask yourself, "what number when multiplied by itself (squared) would equal this number"? In the above example, "what number when multiplied by itself (squared) would be 16?" 4 because $4 \cdot 4 = 16$.

Cube roots are the inverses of cubing a number. Example $4^3 = 64$, so $\sqrt[3]{64} = 4$

When you are trying to find a cube root, ask yourself, "what number when multiplied by itself 3 times (cubed) would be this number"? In the above example, "what number when multiplied by itself 3 times (cubed) would be this number"? 4 because $4 \cdot 4 \cdot 4 = 64$

Perfect Squares and Cubes are equal to whole number values.

Perfect Square Roots		Perfect Cube Roots	
$1^2 = 1$	$\sqrt{1} = 1$	$1^3 = 1$	$\sqrt[3]{1} = 1$
$2^2 = 4$	$\sqrt{4} = 2$	$2^3 = 8$	$\sqrt[3]{8} = 2$
$3^2 = 9$	$\sqrt{9} = 3$	$3^3 = 27$	$\sqrt[3]{27} = 3$
$4^2 = 16$	$\sqrt{16} = 4$	$4^3 = 64$	$\sqrt[3]{64} = 4$
$5^2 = 25$	$\sqrt{25} = 5$	$5^3 = 125$	$\sqrt[3]{125} = 5$
$6^2 = 36$	$\sqrt{36} = 6$	$6^3 = 216$	$\sqrt[3]{216} = 6$
$7^2 = 49$	$\sqrt{49} = 7$	Keep in mind that all square roots have both positive and negative answers. For example, $\sqrt{4}$ can be 2 or -2 since $-2 \cdot -2 = 4$, but the positive root is called the principal root. If the square root symbol is used, give the principal (positive) square root.	
$8^2 = 64$	$\sqrt{64} = 8$		
$9^2 = 81$	$\sqrt{81} = 9$		
$10^2 = 100$	$\sqrt{100} = 10$		
$11^2 = 121$	$\sqrt{121} = 11$		
$12^2 = 144$	$\sqrt{144} = 12$		

How does the square root relate to the area of a square?

Squares are unique because all sides are equal. So, if I had a square with a side length of 7, its area would be $7 \cdot 7$ or 7^2 or 49. What if I gave you the area of a square and asked for the side length?



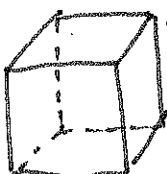
Example:

Area = (side length)² and $\sqrt{\text{Area}} = \text{side length}$,

So $\sqrt{25} = 5 = \text{side length}$

How does the cube root relate to the volume of a cube?

Cubes are also unique because all sides are equal. So, if I had a cube with side lengths of 4, its volume would be $4 \cdot 4 \cdot 4$ or 4^3 , which is 64. What if I gave you the volume of a square and asked for its side length?



volume = 27

Example:

volume = (side length)³ and $\sqrt[3]{\text{volume}} = \text{side length}$,

So $\sqrt[3]{27} = 3 = \text{side length}$