

L1-8 Roots

Complete the graphic organizer.

<p>I think this word means...</p> <p>The # being mult. by itself.</p>	<p>How does this word fit with other words and concepts I know?</p>
<p>square root</p>	
<p>Are there parts of the word that I recognize?</p>	<p>What makes this an important word for me to know?</p> <p>makes solving problems simpler.</p>

What is the relationship between squaring a number and finding the square root? _____

multiplication & division
 addition & subtraction
 square & square root

} Inverse ops.

$$16 = 4^2 = 4 \cdot 4$$

$$\sqrt{16} = 4$$



Real-World Link

Watch

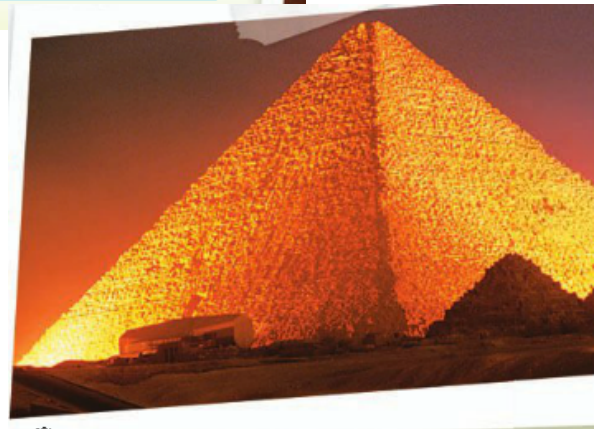


The square base of the Great Pyramid of Giza covers almost 562,500 square feet. How could you determine the length of each side of the base?

$$\boxed{562,500 \text{ ft}^2}$$

$$750 \text{ ft}$$

$$\begin{aligned} \text{Perimeter} &= 750 \cdot 4 \\ &= 3000 \text{ ft.} \end{aligned}$$



+

Square Root



Words A square root of a number is one of its two equal factors.

Symbols If $x^2 = y$, then x is a square root of y .

Example $5^2 = 25$ so 5 is a square root of 25.

Cube Roots

Key

Words A **cube root** of a number is one of its three equal factors.

Symbols If $x^3 = y$, then x is the cube root of y .

Examples



Find each square root.

1. $\sqrt{64}$
 $\sqrt{64} = 8$ Find the positive square root of 64; $8^2 = 64$.

2. $\pm\sqrt{1.21}$
 $\pm\sqrt{1.21} = \pm 1.1$ Find both square roots of 1.21; $1.1^2 = 1.21$.

3. $-\sqrt{\frac{25}{36}}$
 $-\sqrt{\frac{25}{36}} = -\frac{5}{6}$ Find the negative square root of $\frac{25}{36}$; $(\frac{5}{6})^2 = \frac{25}{36}$.

4. $\sqrt{-16}$ $\sqrt{16} = 4$ $\sqrt{16} = -4$
 There is no real square root because no number times itself is equal to -16 . $\sqrt{-16} = -4 \cdot 4$

Got It? Do these problems to find out.

a. $\sqrt{\frac{9}{16}}$
 $\frac{3}{4}$

b. $\pm\sqrt{0.81}$
 ± 0.9

c. $-\sqrt{49}$
 -7

d. $\sqrt{-100}$

no solution

$\pm 1(\sqrt{0.81})$

not the same #.

Example



5. Solve $t^2 = 169$. Check your solution(s).

$$t^2 = \sqrt{169}$$

Write the equation.

$$t = \pm\sqrt{169}$$

Definition of square root

$$t = 13 \text{ and } -13$$

Check $13 \cdot 13 = 169$ and $(-13)(-13) = 169$ ✓

Got It? Do these problems to find out.

e. $289 = a^2$

$$\pm 17 = a$$

$$17 \text{ or } -17$$

f. $m^2 = 0.09$

$$m = \pm 0.3$$

g. $y^2 = \frac{4}{25}$

$$y = \pm \frac{2}{5}$$

Examples



Find each cube root.

6. $\sqrt[3]{125}$

$$\sqrt[3]{125} = 5 \quad 5^3 = 5 \cdot 5 \cdot 5 \text{ or } 125$$

7. $\sqrt[3]{-27}$

$$\sqrt[3]{-27} = -3 \quad (-3)^3 = (-3) \cdot (-3) \cdot (-3) \text{ or } -27$$

Got It? Do these problems to find out.

h. $\sqrt[3]{729}$

+9
~~not ±9~~

i. $\sqrt[3]{-64}$

-4

j. $\sqrt[3]{1,000}$

10





Example



- 8.** Dylan has a planter in the shape of a cube that holds 8 cubic feet of potting soil. Solve the equation $8 = s^3$ to find the side length s of the container.

$$8 = s^3 \quad \text{Write the equation.}$$

$$\sqrt[3]{8} = s \quad \text{Take the cube root of each side.}$$

$$2 = s \quad \text{Definition of cube root}$$

So, each side of the container is 2 feet.

Check $(2)^3 = 8$ ✓

Got It? Do this problem to find out.

- k. An aquarium in the shape of a cube that will hold 25 gallons of water has a volume of 3.375 cubic feet. Solve $s^3 = 3.375$ to find the length of one side of the aquarium.

1.5 ft.