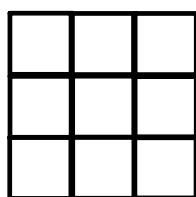


## Sec 3.2: Perfect Squares, Perfect Cubes and Their Roots

### Review Grade 9:

#### Perfect Square

- ↳ a whole number that can be represented as the area of a square with a whole number side length.
- ↳ it can be written as a power with an exponent of 2.



Side Length:

Area:

Written as a Power:

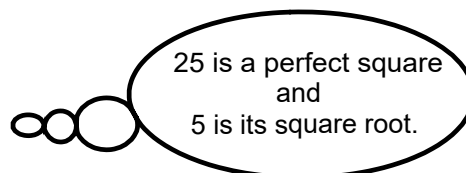
#### Know the list of Perfect Squares!

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, ..., etc!

#### Square Root

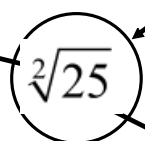
- ↳ the reverse of squaring a number is finding the square root.
- ↳ finding the side length when given the area of a square.

↳ **Notation:**  $\sqrt{25} = 5$



The 2 is called the **index**.

In square roots the index of 2 is understood and not often written.

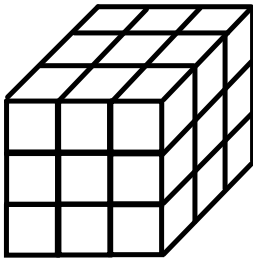


This entire thing is called a **radical**.

The 25 is called the **radicand**.

## Perfect Cube

- ↳ a whole number that can be represented as the volume of a cube with a whole number side length.
- ↳ it can be written as a power with an exponent of 3.



Side Length:

Volume:

Written as a Power:

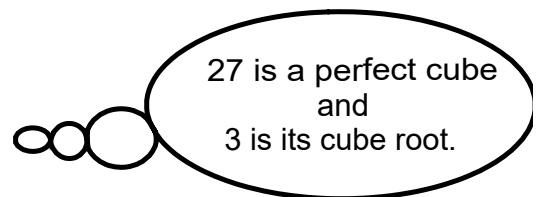
## Know the list of Perfect Cubes!

1, 8, 27, 64, 125, 216, 343, 512, 729, 1000, ....., etc!

## Cube Root

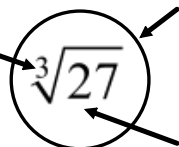
- ↳ the reverse of cubing a number is finding the cube root.
- ↳ finding the side length when given the volume of a cube.

↳ **Notation:**  $\sqrt[3]{27} = 3$



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The 3 is called the **index**.



This entire thing is called a **radical**.

The 27 is called the **radicand**.

Example 1: What is the square root of 36?

↳ prime factors can be grouped into 2 equal groups

a) Use prime factorization to determine 2 equal groups.

Think About:

- b) List all the factors of 36 in ascending order.  
What do you notice about the middle factor?

Interesting Facts about Perfect Squares

- All perfect square numbers will have an odd number of factors.
- The middle factor, when arranged in order from least to greatest, is the square root.

Example 2: What is the cube root of 216?

↳ prime factors can be grouped into 3 equal groups

Example 3 Simplify the following:

a)  $\sqrt[3]{343}$

b)  $\sqrt{121} - \sqrt[3]{216}$

c)  $\sqrt[3]{64} + \sqrt[3]{1000} \div \sqrt{25}$

Example 4

a) If 1000 linking cubes were combined to make a giant cube, what is the area of each face of the giant cube?

b) A cube has volume of  $4913 \text{ in}^3$ . What is the surface area of the cube?

Work Book Questions

p.146 - 147 #6a,,7a, 8a, 10

Extra Practice Questions

p.146 - 147 #4, 5, 7b and 8b.