



## 8.7 Higher Roots

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- Need To Know

- Idea of Higher Roots
- Product and Quotient Rules
- Simplify Higher Roots



## Idea of Higher Roots

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You undo a second power or square with \_\_\_\_\_?

You undo a third power or cube with \_\_\_\_\_?

You undo a fourth power with \_\_\_\_\_?

You undo a fifth power with \_\_\_\_\_?



## Notation and the nth Root

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If  $c^3 = a$ , then  $\sqrt[3]{a} =$

If  $c^n = a$ , then  $\sqrt[n]{a} =$

Note:

Index,  
radicand

Facts:

If  $n$  is even, there are two  $n$ th roots.

The positive one is \_\_\_\_\_

Even roots of negative numbers are not real numbers.



## Notation and the nth Root

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Examples:

$$-\sqrt[4]{81}$$

$$\sqrt[3]{-125}$$

$$\sqrt[4]{-81}$$

$$\sqrt[5]{32}$$



## Perfects to Memorize

Perfect  
Square

1
4
9
16
25
36
49
64
81
100
121
144

Perfect  
Cubes

1
8
27
64
125
216

Perfect  
Fourths

1
16
81
256
625

Perfect  
Fifths

1
32
243



## The Product and Quotient Rules

$$\sqrt[n]{AB} = \sqrt[n]{A} \cdot \sqrt[n]{B} \qquad \sqrt[n]{\frac{A}{B}} = \frac{\sqrt[n]{A}}{\sqrt[n]{B}}$$



## The Product and Quotient Rules

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Examples:

$$\sqrt[3]{32}$$

$$\sqrt[5]{160}$$

$$\sqrt[3]{\frac{10}{27}}$$

$$\sqrt[5]{\frac{17}{32}}$$

end