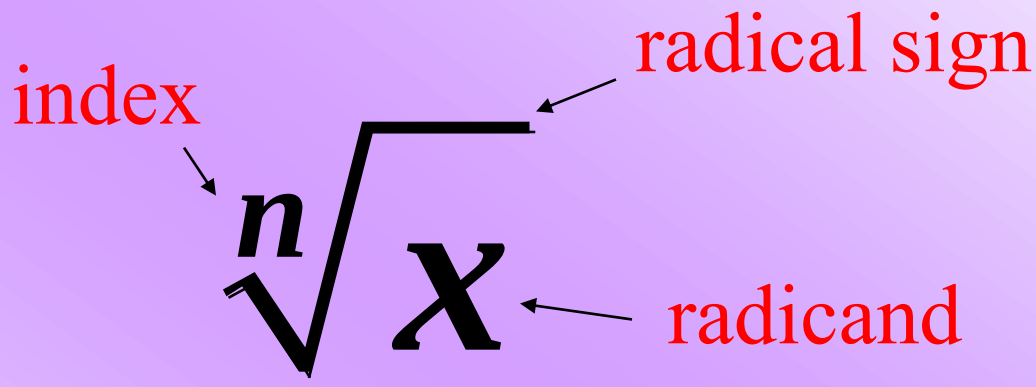
Objectives

The student will be able to:

1. simplify square and cube roots
2. simplify radical expressions.

SOL: A.3

Vocabulary



$\sqrt{64}$ is the square root of 64. $\sqrt[3]{64}$ is the cube root of 64.

In the expression $\sqrt{64}$, $\sqrt{}$ is the **radical sign**, 64 is the **radicand** and 2 (not shown) is the **index**.

In the expression $\sqrt[3]{64}$, 3 is the **index**.

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

If $x^3 = y$ then x is a **cube root** of y.

1. Find $\sqrt{64}$

8

2. Find $-\sqrt{0.04}$

-0.2

3. Find $\sqrt[3]{64}$

4

4. Find $\sqrt[3]{-8}$

-2

3. Find the square root: $\pm\sqrt{121}$

11, -11

4. Find the cube root: $\sqrt[3]{27}$

3

5. Find the square root: $-\sqrt{\frac{25}{81}}$

$$-\frac{5}{9}$$

What numbers are perfect squares?

$1 \cdot 1 = \mathbf{1}$

$2 \cdot 2 = \mathbf{4}$

$3 \cdot 3 = \mathbf{9}$

$4 \cdot 4 = \mathbf{16}$

$5 \cdot 5 = \mathbf{25}$

$6 \cdot 6 = \mathbf{36}$

49, 64, 81, 100, 121, 144, ...

What numbers are perfect cubes?

$1^3 = 1 \cdot 1 \cdot 1 = \mathbf{1}$

$2^3 = 2 \cdot 2 \cdot 2 = \mathbf{8}$

$3^3 = 3 \cdot 3 \cdot 3 = \mathbf{27}$

$4^3 = 4 \cdot 4 \cdot 4 = \mathbf{64}$

$5^3 = 5 \cdot 5 \cdot 5 = \mathbf{125}$

and so on and on and on…..

6. Use a calculator to find each square root. Round the decimal answer to the nearest hundredth.

$$\pm\sqrt{46.5}$$

6.82, -6.82

1. Simplify $\sqrt{147}$

Find a perfect square that goes into 147.

$$\sqrt{147} = \sqrt{49 \cdot 3}$$

$$\sqrt{147} = \sqrt{49} \cdot \sqrt{3}$$

$$\sqrt{147} = 7\sqrt{3}$$

Verify your solution with a calculator.

2. Simplify $\sqrt{605}$

Find a perfect square that goes into 605.

$$\sqrt{121 \cdot 5}$$

$$\sqrt{121} \cdot \sqrt{5}$$

$$11\sqrt{5}$$

Verify your solution with a calculator.

Simplify $\sqrt{72}$

1. $2\sqrt{18}$
2. $3\sqrt{8}$
3. $6\sqrt{2}$ ✓
4. $36\sqrt{2}$

3. Simplify $\sqrt[3]{54}$

Find a perfect cube that goes into 54.

$$\sqrt[3]{54} = \sqrt[3]{27 \cdot 2}$$

$$\sqrt[3]{54} = \sqrt[3]{27} \cdot \sqrt[3]{2}$$

$$3\sqrt[3]{2}$$

Verify your solution with a calculator.

4. Simplify $\sqrt[3]{640}$

Find a perfect cube that goes into 54.

$$\sqrt[3]{640} = \sqrt[3]{64 \cdot 10}$$

$$\sqrt[3]{640} = \sqrt[3]{64} \cdot \sqrt[3]{10}$$

$$8\sqrt[3]{10}$$

Verify your solution with a calculator.

Simplify $\sqrt[3]{625}$

1. 25
2. $5\sqrt[3]{5}$ ✓
3. $5\sqrt[3]{25}$
4. $25\sqrt[3]{5}$