

$$\sqrt[3]{16} = 2\sqrt[3]{2}$$

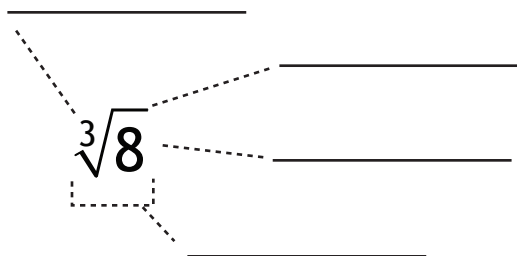
Numbers, Radicals, and Exponents

LESSON FOUR - *Radicals*

Lesson Notes

Introduction Understanding Radicals

a) Label each of the following parts of a radical.



b) What is the index of $\sqrt{5}$?

c) What is the difference between an entire radical and a mixed radical?

d) Is it possible to write a radical without using the radical symbol $\sqrt{\quad}$?

Numbers, Radicals, and Exponents

LESSON FOUR - *Radicals*

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$$\sqrt[3]{16} = 2\sqrt[3]{2}$$

Example 1

Convert each entire radical to a mixed radical.

a) $\sqrt{20}$

Prime Factorization Method

Perfect Square Method

b) $\sqrt{32}$

Prime Factorization Method

Perfect Square Method

c) $\sqrt[3]{16}$

Prime Factorization Method

Perfect Cube Method

$$\sqrt[3]{16} = 2\sqrt[3]{2}$$

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Example 2

Convert each entire radical to a mixed radical using the method of your choice.

a) $\sqrt{24}$

b) $\sqrt{72}$

c) $\sqrt{49}$

d) $\sqrt[3]{81}$

e) $\sqrt[3]{64}$

f) $\sqrt[4]{48}$

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Example 3

Convert each mixed radical to an entire radical.

a) $3\sqrt{3}$

Reverse Factorization Method

Perfect Square Method

b) $6\sqrt{2}$

Reverse Factorization Method

Perfect Square Method

c) $2\sqrt[3]{5}$

Reverse Factorization Method

Perfect Cube Method

$$\sqrt[3]{16} = 2\sqrt[3]{2}$$

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Example 4

Convert each mixed radical to an entire radical using the method of your choice.

a) $4\sqrt{2}$

b) $5\sqrt{3}$

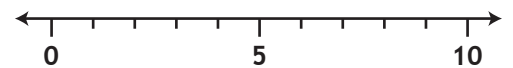
c) $3\sqrt[3]{3}$

d) $2\sqrt[4]{3}$

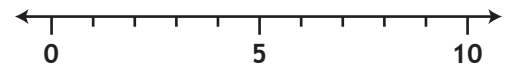
Example 5

Estimate each radical and order them on a number line.

a) $\sqrt{42}$ $\sqrt{20}$ $\sqrt{8}$ $\sqrt{14}$



b) $\sqrt[3]{92}$ $\sqrt[3]{169}$ $\sqrt[3]{54}$ $\sqrt[3]{35}$



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$$\sqrt[3]{16} = 2\sqrt[3]{2}$$

Example 6

Simplify each expression without using a calculator.

a) $\frac{2\sqrt{12}}{4}$

b) $\frac{3\sqrt[3]{27}}{36}$

c) $\frac{3}{4}\sqrt{32}$

d) $\sqrt{\frac{49}{81}}$

e) $\frac{3\sqrt[3]{72}}{\sqrt{64}}$

$$\sqrt[3]{16} = 2\sqrt[3]{2}$$

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Example 7

Write each power as a radical.

a) $3^{\frac{1}{2}}$

b) $(-4)^{\frac{1}{3}}$

c) $2^{\frac{4}{3}}$

d) $(-7)^{\frac{2}{5}}$

e) $\left(\frac{2}{3}\right)^{\frac{3}{2}}$

f) $16^{0.25}$

Example 8

Write each radical as a power.

a) $\sqrt{5}$

b) $\sqrt[4]{9}$

c) $\sqrt[3]{2^2}$

d) $(\sqrt[5]{-3})^4$

e) $\left(\sqrt[3]{\frac{5}{7}}\right)^2$

f) $\sqrt{\left(\frac{3}{4}\right)^2}$