Pre-Calculus 11 - VLN

Chapter 5: Radicals

Lesson 5: Simplifying Radicals Part 1

Question #1

Reference Q.14296
Mentally evaluate, where possible, using the real number system.

a. $\sqrt{81}$

b. $\sqrt[4]{81}$

c. $5\sqrt[3]{27}$

d. $\sqrt[5]{100000}$

e. $\sqrt{\frac{16}{25}}$

f. $\sqrt[4]{\frac{1}{16}}$

g. $4\sqrt{\frac{1}{16}}$

h. $-\sqrt{1}$

i. $\sqrt{-1}$

j. $\sqrt[5]{-1}$

k. $7\sqrt[3]{-125}$

l. $\sqrt[4]{-\frac{1}{16}}$

m. $3\sqrt{144}$

n. $\frac{1}{2}\sqrt[5]{32}$

o. $-\sqrt[11]{-1}$

p. $\sqrt[3]{-\frac{8}{27}}$

Question #2

Reference Q.14360
Without using a calculator, determine which of the following radicals is not equal to the others.

A. $12\sqrt{2}$
B. $\sqrt{288}$
C. $6\sqrt{8}$
D. $4\sqrt{72}$

Question #3

Reference Q.14298
Use a calculator to evaluate.

a. $\sqrt[4]{4096}$

b. $\sqrt[5]{-243}$

c. $-\sqrt[4]{2401}$

d. $-\sqrt[3]{729}$

e. $\sqrt[3]{-729}$

f. $-8\sqrt[4]{\frac{1}{256}}$

g. $4\sqrt[6]{0.015625}$

h. $\sqrt[4]{-6561}$

i. $\frac{3}{2}\sqrt[4]{\frac{16}{81}}$

Question #4

Reference Q.14299
Evaluate to the nearest hundredth.

a. $\sqrt{10}$

b. $\sqrt[8]{29}$

c. $-\frac{3}{2}\sqrt[9]{-527}$

Question #5

Reference Q.14300
Evaluate to the nearest tenth.

a. $\sqrt[5]{-25}$

b. $-5\sqrt[4]{169}$

c. $\frac{1}{2}\sqrt[3]{-81}$

Question #6

Reference Q.14334

Do not use a calculator to answer this question

Given that $\sqrt{6}$ is approximately equal to 2.45, and $\sqrt{60}$ is approximately equal to 7.75, then find the approximate value of

a. $\sqrt{600}$

b. $\sqrt{6000}$

c. $\sqrt{600,000}$

d. $\sqrt{0.06}$

e. $\sqrt{0.6}$

f. $\sqrt{24}$

g. $\sqrt{540}$

h. $\sqrt{\frac{6}{25}}$

Question #7

Reference Q.14302

Explain the meaning of the index 4 in the radical $\sqrt[4]{36}$.

Question #8

Reference Q.14303

Determine whether each statement is true or false.

a. $\sqrt{30} = \sqrt{5}\sqrt{6}$

b. $\sqrt{6-4} = \sqrt{6} - \sqrt{4}$

c. $\sqrt{3} = \frac{\sqrt{45}}{\sqrt{15}}$

d. $\frac{\sqrt{20}}{\sqrt{10}} = \sqrt{10}$

e. $\sqrt{2} + \sqrt{2} = \sqrt{4}$

f. $\sqrt{2} \times \sqrt{2} = \sqrt{4}$

g. $\sqrt{\frac{1}{2} \times 30} = \sqrt{15}$

h. $\frac{1}{2}\sqrt{30} = \sqrt{15}$

Question #9

Reference Q.14305

Express as a product of radicals.

a. $\sqrt{35}$

b. $\sqrt{33}$

c. $\sqrt{65}$

d. $\sqrt{49}$

Question #10

Reference Q.14306

Consider the following statements.

I. The cube roots of -27 are ± 3.

II. The fourth roots of 81 are ± 3.

III. $-\sqrt[3]{1000} = \sqrt[3]{-1000}$

IV. $-\sqrt[4]{16} = \sqrt[4]{-16}$

Which of these statements are true?

Question #11

Reference Q.14297

State whether the following are true or false.

a. The square root of 25 is ± 5.

b. $\sqrt{25} = \pm 5$

c. If $x^2 = 25, x \in \mathbb{R}$, then $x = \pm 5$.

Question #12

Reference Q.14308

To the nearest hundredth, the value of $\sqrt[5]{-\frac{7}{8}} + 2\sqrt{\frac{7}{8}}$ is ____.

Question #13

Reference Q.14304

Write the following as a single radical in the form $\sqrt{x}$.

a. $\sqrt{5} \times \sqrt{7}$

b. $\sqrt{14 \times 2}$

c. $\sqrt{3} \cdot \sqrt{8}$

d. $\sqrt{6 \cdot 11}$

e. $\dfrac{\sqrt{20}}{\sqrt{10}}$

f. $\dfrac{\sqrt{25}}{\sqrt{5}}$

g. $\dfrac{\sqrt{10}\sqrt{6}}{\sqrt{2}}$

h. $\dfrac{\sqrt{\sqrt{81}}}{\sqrt{\sqrt{9}}}$

Question #14

Reference Q.14322

Identify whether each radical is written as a mixed radical or an entire radical.

a. $\sqrt{35}$

b. $2\sqrt{7}$

c. $\sqrt{81}$

d. $0.3\sqrt{6}$

Question #15

Reference Q.14323

Convert the following radicals to mixed radicals in simplest form.

a. $\sqrt{8}$

b. $\sqrt{20}$

c. $\sqrt{75}$

d. $\sqrt{98}$

e. $3\sqrt{32}$

f. $-5\sqrt{45}$

g. $2\sqrt{54}$

h. $-4\sqrt{48}$

Question #16

Reference Q.14324

Convert the following radicals to mixed radicals in simplest form. There are two which cannot be converted. Identify them and explain why they cannot be converted to mixed radicals.

a. $\sqrt{96}$

b. $\sqrt{242}$

c. $-\dfrac{2}{3}\sqrt{180}$

d. $\dfrac{1}{8}\sqrt{320}$

e. $\sqrt{245}$

f. $4\sqrt{338}$

g. $\sqrt{1250}$

h. $\sqrt{66}$

i. $-\dfrac{5}{6}\sqrt{304}$

j. $\sqrt{980}$

k. $4\sqrt{272}$

l. $-3\sqrt{288}$

m. $2\sqrt{369}$

n. $\sqrt{364}$

o. $\dfrac{2}{5}\sqrt{450}$

p. $\dfrac{7}{11}\sqrt{341}$

Question #17

Reference Q.14328

Consider the following radicals $2\sqrt[3]{11}, 3\sqrt[3]{3}, 4\sqrt[3]{2}, 2\sqrt[3]{6}.$

a. **Explain** how to arrange the radicals in order from least to greatest without using a calculator.

b. Arrange the radicals in order from least to greatest.

Question #18

Reference Q.14327

Do not use a calculator to answer the following question.

Arrange the following radicals in order from least to greatest.

$7\sqrt[6]{1}, -3\sqrt[3]{-27}, \frac{5}{2}\sqrt[4]{16}, 3\sqrt{\sqrt[3]{64}}$

Question #19

Reference Q.14346

Express as an entire radical.

a. $6\sqrt{y}$

b. $8\sqrt{c^2}$

c. $10\sqrt{2yz^3}$

d. $-3\sqrt[3]{x^2}$

e. $c\sqrt{c}$

f. $x\sqrt{3y^3}$

g. $11c^2\sqrt{c^2d}$

h. $5a^3b\sqrt{3a^2b}$

i. $4\sqrt{3a^2b}$

j. $2p^2q\sqrt[3]{5pq^2}$

k. $7p^8q^9\sqrt{p^2r}$

l. $2xy^3\sqrt[4]{9x}$

Question #20

Reference Q.14347

Express each as a mixed radical in simplest form.

a. $\sqrt{a^5}$

b. $\sqrt{t^3}$

c. $\sqrt{x^{11}}$

d. $\sqrt[3]{x^4}$

e. $\sqrt[3]{b^8}$

f. $\sqrt[4]{x^6}$

Question #21

Reference Q.14332

Convert the following to entire radical form.

a. $2\sqrt{6}$

b. $3\sqrt{7}$

c. $5\sqrt{15}$

d. $12\sqrt{2}$

e. $3\sqrt{25}$

f. $-8\sqrt{3}$

g. $9\sqrt{10}$

h. $-4\sqrt{5}$

Question #22

Reference Q.14333

Convert the following to entire radical form.

a. $\frac{1}{3}\sqrt{27}$

b. 15

c. $\frac{3}{2}\sqrt{8}$

d. $3^2\sqrt{21}$

Question #23

Reference Q.14325
Consider the following radicals to mixed radicals in simplest form.

a. $\sqrt[3]{48}$

b. $\sqrt[3]{128}$

c. $\sqrt[3]{2\,000}$

d. $5\sqrt[3]{-81}$

e. $\frac{5}{6}\sqrt[3]{108}$

f. $5\sqrt[4]{162}$

g. $\sqrt[5]{-192}$

h. $-2\sqrt[3]{625}$

Question #24

Reference Q.14326
Convert the following mixed radicals to entire radicals.

a. $2\sqrt[4]{2}$

b. $3\sqrt[3]{4}$

c. $-3\sqrt[4]{3}$

d. $-10\sqrt[3]{5}$

e. $2\sqrt[5]{6}$

f. $\frac{1}{2}\sqrt[3]{16}$

g. $\frac{3}{10}\sqrt[4]{100\,000}$

h. $-5\sqrt[3]{9}$

Question #25

Reference Q.14348
Express each as a mixed radical in simplest form.

a. $\sqrt{8y^2}$

b. $\sqrt{16p^3}$

c. $\sqrt{75y^3z^4}$

d. $\sqrt{300a^9w^7}$

e. $5\sqrt{28c^4d^3}$

f. $-6\sqrt{29a^4b^8}$

g. $7p^3q^2\sqrt{27p^5q^6}$

h. $\frac{2}{3}c\sqrt{81c^3d^{12}}$

i. $11x^7y^{15}\sqrt{242x^9y^{10}}$

j. $\sqrt[3]{2000x^7}$

k. $4\sqrt[3]{250b^{13}}$

l. $\sqrt[4]{32x^9}$

Question #26

Reference Q.14329
$\sqrt[3]{240}$ is equivalent to

A. $2\sqrt[3]{40}$
B. $4\sqrt[3]{15}$
C. $2\sqrt[3]{30}$
D. $8\sqrt[3]{30}$

Question #27

Reference Q.14330
Consider the following two statements:

Statement 1: $-3\sqrt[4]{8} = 3\sqrt[3]{-8}.$
Statement 2: $-2\sqrt[3]{7} = 2\sqrt[3]{-7}$

Which of the following is correct?

A. Both statements are true.
B. Both statements are false.
C. Statement 1 is true, and statement 2 is false.
D. Statement 1 is false, and statement 2 is true.

Question #28

Reference Q.14345

The mixed radical $\frac{1}{12}\sqrt[3]{128}$ can be converted to a mixed radical in simplest form $a\sqrt[3]{b}$. The value of $a + b$, to the nearest tenth, is _____.

Question #29

Reference Q.14349

$\sqrt{3x}\sqrt{2x}$ is equivalent to

A. $\sqrt{6x}$
B. $\sqrt{36x^2}$
C. $6\sqrt{x}$
D. $x\sqrt{6}$