

Just in Time Quick Check

Standard of Learning A.EO.4

Strand: Expressions and Operations

Standard of Learning A.EO.4

The student will simplify and determine equivalent radical expressions involving square roots of whole numbers and cube roots of integers.

Students will demonstrate the following Knowledge and Skills:

- a) Simplify and determine equivalent radical expressions involving the square root of a whole number in simplest form.
- b) Simplify and determine equivalent radical expressions involving the cube root of an integer.
- c) Add, subtract, and multiply radicals, limited to numeric square and cube root expressions.
- d) Generate equivalent numerical expressions and justify their equivalency for radicals using rational exponents, limited to rational exponents of $\frac{1}{2}$ and $\frac{1}{3}$ (e.g., $\sqrt{5} = 5^{\frac{1}{2}}$; $\sqrt[3]{8} = 8^{\frac{1}{3}} = (2^3)^{\frac{1}{3}} = 2$).

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting and Prerequisite SOL: 8.NS.1

Just in Time Quick Check A.EO.4

1. A student was asked to simplify the following expression.

$$-8\sqrt{4500}$$

- a) The student wrote $-8 \cdot 225 \cdot \sqrt{20}$ as the next step. What mistake did they make?
- b) What is the correct solution?

2. A student was asked to simplify the expression:

$$\sqrt[3]{1536}$$

The student obtained the following result:

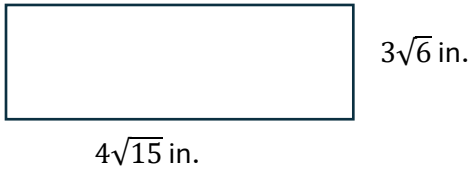
$$4\sqrt[3]{24}$$

Determine if this answer is correct or incorrect. Justify your thinking.

3. Simplify the expression.

$$12\sqrt{5} + 2\sqrt{5} + \sqrt{7}$$

4. Find the area of this rectangle with the given length and width. Write the answer in simplest form.



5. Write each expression in radical form or write each radical in exponential form.

- a) $8^{\frac{1}{2}}$
- b) $\sqrt{15}$
- c) $\sqrt{63}$

A.EO.4 Just in Time Quick Check Teacher Notes

Common Errors/Misconceptions and their Possible Indications

1. A student was asked to simplify the following expression.

$$-8\sqrt{4500}$$

- a) The student wrote $-8 \cdot 225 \cdot \sqrt{20}$ as the next step. What mistake did they make?
- b) What is the correct solution?

A common error students may make when simplifying radical expressions is to multiply all values inside and outside of the radical instead of factoring the radicand. Students may misinterpret $\sqrt{4500}$ as if it equals $225 \cdot 20$ ($\sqrt{4500} \neq 225 \cdot 20$). Students may forget to simplify the radicand, check for perfect squares, or check their solutions.

2. A student was asked to simplify the expression:

$$\sqrt[3]{1536}$$

The student obtained the following result:

$$4\sqrt[3]{24}$$

Determine if this answer is correct or incorrect. Justify your thinking.

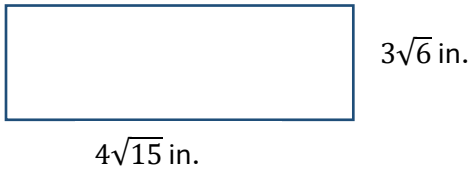
A common error students may make is not completely simplifying the radicand. This may indicate they are not identifying all the perfect cubes in the radicand. The teacher may encourage the student to use the prime factorization method to identify all the factors and then circle groups of three common factors.

3. Simplify the expression.

$$12\sqrt{5} + 2\sqrt{5} + \sqrt{7}$$

A common error students may make is to add the radicands, resulting in an incorrect simplification of $14\sqrt{17}$. This may indicate students do not understand that to add radical terms, they must have the same radicand. Similarly, students may not understand that $\sqrt{a} + \sqrt{b} \neq \sqrt{a+b}$. To reinforce this concept, teachers may want to revisit grouping like terms of an algebraic expression, as well as using technology to verify if the simplified expression is equivalent to the original expression.

4. Find the area of this rectangle with the given length and width. Write the area in the simplest form.



A common error students may make is to multiply the coefficients and radicands but neglect to simplify the product of the radicand. While this will give the correct area, the area will not be in simplest form. This may indicate that students believe simplifying only involves performing the operation of multiplication. Teachers may want to have the students apply the commutative property to rewrite the expression as $4 \cdot 3\sqrt{15 \cdot 6}$ before simplifying.

5. Write each expression in radical form or write each radical in exponential form.

- a) $8^{\frac{1}{2}}$
- b) $\sqrt{15}$
- c) $\sqrt[4]{63}$

A common error students make when writing expressions in radical form is they may not realize that radicals and fractional exponents represent the same thing. They may forget that the index represents the root of the radical they are simplifying. When simplifying expressions with radical exponents, students may confuse the root with the power and write \sqrt{x} as x^2 instead of $x^{\frac{1}{2}}$.