

Unit 9 Objective 2 Remediation

Simplifying Square Roots

Simplifying a square root of a whole number means finding an equivalent expression with the smallest possible number under the radical sign. This is called writing the number in **simplest radical form**.

To write a square root in simplest radical form we first find the **largest possible square factor** of the number under the radical sign. Then we use the Product property.

Product Property of Square Roots

The Product rule states that we can break the square root a number into the square root of product of two factors.

$$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$$

Example One

Simplify $\sqrt{108}$

Look for the **largest possible perfect square** that will divide evenly into 108. 4, 9 and 36 are perfect squares that divide evenly into 108, but 36 is the largest.

$$\sqrt{108} = \sqrt{36} \cdot \sqrt{3} = 6\sqrt{3}$$

The simplest radical form of $\sqrt{108} = 6\sqrt{3}$.

Example Two

Simplify $\sqrt{192}$

Look for the **largest possible perfect square** that will divide evenly into 192. 4, 16 and 64 are perfect squares that divide evenly into 192, but 64 is the largest.

$$\sqrt{192} = \sqrt{64} \cdot \sqrt{3} = 8\sqrt{3}$$

The simplest radical form of $\sqrt{192} = 8\sqrt{3}$.



Simplify each expression below and find your answer in the corresponding answer column. Write the letter of the exercise in the box that contains the number of the answer.

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|---|--------------|----|--------------|---|--------------------|----|----------------|
| L | $\sqrt{8}$ | 18 | $7\sqrt{2}$ | S | $5\sqrt{18}$ | 19 | $6\sqrt{7}$ |
| I | $\sqrt{45}$ | 14 | $5\sqrt{5}$ | U | $3\sqrt{28}$ | 13 | $24\sqrt{3}$ |
| A | $\sqrt{50}$ | 12 | $2\sqrt{2}$ | A | $2\sqrt{1000}$ | 3 | $24\sqrt{2}$ |
| T | $\sqrt{12}$ | 4 | $5\sqrt{2}$ | P | $\sqrt{1,000,000}$ | 9 | $15\sqrt{2}$ |
| O | $\sqrt{98}$ | 28 | $4\sqrt{3}$ | E | $3\sqrt{128}$ | 5 | $16\sqrt{5}$ |
| S | $\sqrt{48}$ | 20 | $2\sqrt{3}$ | K | $8\sqrt{27}$ | 23 | 1000 |
| E | $\sqrt{125}$ | 25 | $3\sqrt{5}$ | L | $4\sqrt{80}$ | 16 | $20\sqrt{10}$ |
| A | $\sqrt{20}$ | 8 | $3\sqrt{7}$ | H | $-3\sqrt{54}$ | 10 | $-8\sqrt{6}$ |
| S | $\sqrt{72}$ | 1 | $6\sqrt{2}$ | A | $-7\sqrt{40}$ | 21 | $30\sqrt{3}$ |
| Y | $\sqrt{63}$ | 7 | $10\sqrt{2}$ | B | $-8\sqrt{121}$ | 11 | $-14\sqrt{10}$ |
| E | $\sqrt{144}$ | 6 | $4\sqrt{2}$ | S | $2\sqrt{500}$ | 24 | $20\sqrt{5}$ |
| W | $\sqrt{32}$ | 22 | $2\sqrt{5}$ | T | $-4\sqrt{24}$ | 26 | $15\sqrt{7}$ |
| D | $\sqrt{75}$ | 27 | 12 | Z | $3\sqrt{175}$ | 2 | $-9\sqrt{6}$ |
| A | $\sqrt{200}$ | 15 | $5\sqrt{3}$ | C | $5\sqrt{108}$ | 17 | -88 |

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
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