

Lesson 1: Simplifying Square Roots and Rationalizing—Worksheet

Problems 1–6. Simplify each square root. Show your work using equals signs.

$$\begin{aligned} 1. \quad & \sqrt{24} \\ & = \sqrt{4 \cdot 6} \\ & = \sqrt{4} \sqrt{6} \\ & = 2\sqrt{6} \end{aligned}$$

$$\begin{aligned} 2. \quad & \sqrt{700} \\ & = \sqrt{100 \cdot 7} \\ & = \sqrt{100} \sqrt{7} \\ & = 10\sqrt{7} \end{aligned}$$

$$\begin{aligned} 3. \quad & \sqrt{588} \\ & = \sqrt{4 \cdot 147} \\ & = \sqrt{4} \sqrt{147} \\ & = 2\sqrt{147} \\ & = 2\sqrt{49 \cdot 3} \\ & = 2\sqrt{49} \sqrt{3} \\ & = 2 \cdot 7 \sqrt{3} \\ & = 14\sqrt{3} \end{aligned}$$

$$\begin{aligned} 4. \quad & \sqrt{324} \\ & = \sqrt{4 \cdot 81} \\ & = \sqrt{4} \sqrt{81} \\ & = 2 \cdot 9 \\ & = 18 \end{aligned}$$

$$\begin{aligned}
5. \quad & \sqrt{450} \\
& = \sqrt{9 \cdot 50} \\
& = \sqrt{9} \sqrt{50} \\
& = 3\sqrt{50} \\
& = 3\sqrt{25 \cdot 2} \\
& = 3\sqrt{25} \sqrt{2} \\
& = 3 \cdot 5 \sqrt{2} \\
& = 15\sqrt{2}
\end{aligned}$$

$$6. \quad \sqrt{462}$$

$$\begin{aligned}
& 462 \\
& = 2 \cdot 231 \\
& = 2 \cdot 3 \cdot 77 \\
& = 2 \cdot 3 \cdot 7 \cdot 11
\end{aligned}$$

So, 462 is not divisible by any perfect squares (other than 1) and $\sqrt{462}$ is already simplified.

$$7. \text{ Rationalize the numerator: } \frac{\sqrt{3}}{2}$$

$$\frac{\sqrt{3}}{2} = \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{3}{2\sqrt{3}}$$

$$8. \text{ Rationalize the denominator: } \frac{2}{\sqrt{2}}$$

$$\frac{2}{\sqrt{2}} = \frac{2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \sqrt{2}$$