

Radicals Expressions & Properties of Exponents

Simplify each expression by apply the properties of exponents. Write your answer in simplest radical form when possible.

<p>1. $8^2 \cdot 8^2$</p> $8^{1/2 + 3/2} = 8^{4/2}$ <p style="text-align: center;">↓</p> $\boxed{64} = 8^2$	<p>2. $3x^2 \cdot x$</p> $3 \cdot x^{1/2 + 1} = 3x^{3/2}$ <p style="text-align: center;">↓</p> $3\sqrt{x^3}$ $= \boxed{3x\sqrt{x}}$	<p>3. $(16a^8b^4)^{1/4}$</p> $16^{1/4} a^{8/4} b^{4/4}$ <p style="text-align: center;">↓</p> $\boxed{2a^2b}$
<p>4. $\frac{5^4}{5^4}$</p> $5^{3/4 - 1/4} = 5^{2/4}$ <p style="text-align: center;">↓</p> $\boxed{\sqrt{5}} = 5^{1/2}$	<p>5. $\left(\frac{x^9}{8}\right)^{2/3}$</p> $\frac{x^{9 \cdot 2/3}}{8^{2/3}} = \frac{x^{18/3}}{8^{2/3}}$ $= \frac{x^6}{\sqrt[3]{8^2}} = \boxed{\frac{x^6}{4}}$	<p>6. $\left(\frac{144a^8}{9y^{18}}\right)^{1/2}$</p> $\frac{144^{1/2} a^{8/2}}{9^{1/2} y^{18/2}} = \frac{12a^4}{3y^9}$ $\boxed{\frac{4a^4}{y^9}}$

$$10. \left(\frac{81x^{12}}{y^{20}}\right)^{\frac{1}{4}}$$

$$\frac{81^{1/4} x^{12/4}}{y^{20/4}} = \boxed{\frac{3x^3}{y^5}}$$

$$11. (8x^3z^9)^{\frac{2}{3}}$$

$$8^{2/3} x^{6/3} z^{18/3}$$

$$\downarrow$$

$$\boxed{4x^2z^6}$$

$$12. (m^4n^2)^{\frac{1}{2}} \sqrt{m^2n^2}$$

$$m^{4/2} n^{2/2} (m^{2/2} n^{2/2})$$

$$m^2 n (mn)$$

$$\boxed{m^3 n^2}$$

$$13. (x^2y^2)^{\frac{1}{4}} \cdot \sqrt[3]{y^3}$$

$$x^{4/2} y^8 \cdot (y^{3/3})$$

$$x^2 y^8 \cdot (y)$$

$$x^2 (y^9)$$

$$14. \frac{x^5}{\sqrt{x}}$$

$$\frac{x^5}{x^{1/2}} = x^{5-1/2}$$

$$= x^{9/2}$$

$$= \sqrt{x^9}$$

$$= \boxed{x^4 \sqrt{x}}$$

$$15. \frac{2x^{\frac{3}{2}}}{8x^2}$$

$$\frac{1x^{3/2-4/2}}{4} = \frac{x^{-5/2}}{4}$$

$$= \frac{x^{-3}}{4} = \boxed{\frac{1}{4x^3}}$$