

Practice: Which are equivalent?

$$\sqrt[3]{x^7} \cdot x^{\frac{1}{2}}$$

$$\sqrt{x}$$

$$\frac{\sqrt[3]{x^4}}{x^{\frac{5}{6}}}$$

$$\sqrt[5]{x}$$

$$\sqrt[3]{x^{\frac{3}{5}}}$$

$$\sqrt[6]{x^{17}}$$

Which are equivalent?

$$\begin{aligned} \sqrt[3]{x^7} \cdot x^{\frac{1}{2}} &= x^{\frac{7}{3}} \cdot x^{\frac{1}{2}} = x^{\frac{7}{3} + \frac{1}{2}} = x^{\frac{14}{6} + \frac{3}{6}} = x^{\frac{17}{6}} \\ \frac{\sqrt[3]{x^4}}{x^{\frac{5}{6}}} &= x^{\frac{4}{3} - \frac{5}{6}} = x^{\frac{8}{6} - \frac{5}{6}} = x^{\frac{3}{6}} = x^{\frac{1}{2}} \\ \sqrt[3]{x^{\frac{3}{5}}} &= \left(x^{\frac{3}{5}}\right)^{\frac{1}{3}} = x^{\frac{3}{5} \cdot \frac{1}{3}} = x^{\frac{3}{15}} = x^{\frac{1}{5}} \end{aligned}$$

The diagram shows three equivalent expressions for $x^{\frac{1}{2}}$ and $x^{\frac{1}{5}}$. A green arrow points from the first expression to \sqrt{x} . A blue arrow points from the second expression to $\sqrt[5]{x}$. A yellow arrow points from the third expression to $\sqrt[6]{x^{17}}$.