

Objective #15

Simplify nth roots

Simplify:

1. $\sqrt[3]{48}$ **[A]** $2\sqrt[3]{6}$ [B] $6\sqrt[3]{2}$ [C] $4\sqrt[3]{12}$ [D] $2\sqrt[3]{12}$

$$\begin{array}{r} 2 \overline{)48} \\ 2 \overline{)24} \\ 2 \overline{)12} \\ 2 \overline{)6} \\ 3 \end{array}$$

$$\sqrt[3]{2^4 \cdot 3} = \sqrt[3]{2^3 \cdot 2 \cdot 3} = 2\sqrt[3]{6}$$

2. $(\sqrt[3]{x^6})^3$ **[A]** x^6 [B] $x^{3/2}$ [C] $x^{1/2}$ [D] x^{18}

$$\begin{array}{l} (x^{6/3})^3 \\ (x^2)^3 \end{array}$$

$$= x^6$$

3. $\sqrt[4]{x^{15}y^{11}}$

- [A] $x^3y^2\sqrt{x^3y^3}$ [B] $x^3y^3\sqrt[4]{x^3y^2}$ [C] $x^{11}y^7\sqrt{xy}$ **[D]** $x^3y^2\sqrt[4]{x^3y^3}$

Rewrite w/
multiples of 4

$$\sqrt[4]{x^{12}x^3y^8y^3} = \sqrt[4]{x^{12}y^8}\sqrt[4]{x^3y^3} = x^3y^2\sqrt[4]{x^3y^3}$$

4. $\sqrt[4]{1280}$

$$\begin{array}{r} 2 \overline{)1280} \\ 2 \overline{)640} \\ 2 \overline{)320} \\ 2 \overline{)160} \\ 2 \overline{)80} \\ 2 \overline{)40} \\ 2 \overline{)20} \\ 2 \overline{)10} \\ 5 \end{array}$$

$$2^8 \cdot 5$$

$$\begin{array}{l} \sqrt[4]{2^8 \cdot 5} \\ = 2^2 \sqrt[4]{5} \\ = 4 \sqrt[4]{5} \end{array}$$