

15.1b – Simplifying Radicals with Variables

Simplify using the perfect roots chart to help.

1. $\sqrt{512x^2} =$

$$\begin{aligned} & \sqrt{\underline{64} \cdot \underline{4} \cdot \underline{2} \cdot \underline{x^2}} = \\ & \underline{8 \cdot 2 \cdot x \sqrt{2}} = \\ & \underline{16x\sqrt{2}} \end{aligned}$$

2. $\sqrt{125x^4y^9} =$

$$\begin{aligned} & \sqrt{\underline{25} \cdot \underline{5} \cdot \underline{x^4} \cdot \underline{y^8} \cdot \underline{y}} = \\ & \underline{5x^2y^4\sqrt{5y}} \end{aligned}$$

3. $\sqrt[3]{40x^8} =$

$$\begin{aligned} & \sqrt[3]{\underline{8} \cdot \underline{5} \cdot \underline{x^3} \cdot \underline{x^3} \cdot \underline{x^2}} = \\ & \underline{2 \cdot x \cdot x \sqrt[3]{5x^2}} = \\ & \underline{2x^2 \sqrt[3]{5x^2}} \end{aligned}$$

4. $\sqrt[4]{128x^7y^7} =$

$$\begin{aligned} & \sqrt[4]{\underline{16} \cdot \underline{8} \cdot \underline{x^4} \cdot \underline{x^3} \cdot \underline{y^4} \cdot \underline{y^3}} = \\ & \underline{2xy \sqrt[4]{8x^3y^3}} \end{aligned}$$

5. $\sqrt[5]{96x^6y^3} =$

$$\begin{aligned} & \sqrt[5]{\underline{32} \cdot \underline{3} \cdot \underline{x^5} \cdot \underline{x} \cdot \underline{y^3}} = \\ & \underline{2x \sqrt[5]{3xy^3}} \end{aligned}$$

6. $\sqrt[6]{256x^8} =$

$$\begin{aligned} & \sqrt[6]{\underline{64} \cdot \underline{4} \cdot \underline{x^6} \cdot \underline{x^2}} = \\ & \underline{2x \sqrt[6]{4x^2}} \end{aligned}$$

7. $\sqrt[7]{512x^3} =$

$$\begin{aligned} & \sqrt[7]{\underline{128} \cdot \underline{4} \cdot \underline{x^3}} = \\ & \underline{2\sqrt[7]{4x^3}} \end{aligned}$$

8. $\sqrt[9]{1536x^5y^{12}} =$

$$\begin{aligned} & \sqrt[9]{\underline{512} \cdot \underline{3} \cdot \underline{x^5} \cdot \underline{y^9} \cdot \underline{y^3}} = \\ & \underline{2y \sqrt[9]{3x^5y^3}} \end{aligned}$$