

15.1a – Simplifying Radicals with Variables

Simplify the following radicals.

$$\sqrt{x^2} = x$$

1. $\sqrt{x^4} =$

$$\begin{aligned} &\sqrt{\underline{x^2} \cdot \underline{x^2}} = \\ &\quad x \cdot x = \\ &\quad \quad x^2 \end{aligned}$$

2. $\sqrt{36x^8} =$

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

3. $\sqrt{98x^9y^4} =$

$$\begin{aligned} &7\sqrt{\underline{2} \cdot \underline{x^8} \cdot \underline{x} \cdot \underline{y^4}} = \\ &7x^4y^2\sqrt{2x} \end{aligned}$$

$$\begin{array}{r} 298 \\ 7 \overline{) 49} \\ \underline{49} \\ 0 \end{array}$$

4. $5\sqrt{300x^{16}} =$

$$\begin{aligned} &5 \cdot 10\sqrt{\underline{3} \cdot \underline{x^{16}}} = \\ &50x^8\sqrt{3} \end{aligned}$$

$$\begin{array}{r} 3300 \\ 10 \overline{) 100} \\ \underline{100} \\ 0 \end{array}$$

5. $\sqrt{x^5} =$

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

6. $\sqrt{24x^7} =$

$$\begin{aligned} &2\sqrt{\underline{6} \cdot \underline{x^6} \cdot \underline{x}} = \\ &2x^3\sqrt{6x} \end{aligned}$$

$$\begin{array}{r} 224 \\ 2 \overline{) 12} \\ \underline{12} \\ 0 \end{array}$$

7. $\sqrt{72x^9y^{13}} =$

$$\begin{aligned} &6\sqrt{\underline{2} \cdot \underline{x^8} \cdot \underline{x} \cdot \underline{y^{12}} \cdot \underline{y}} = \\ &6x^4y^6\sqrt{2xy} \end{aligned}$$

$$\begin{array}{r} 272 \\ 6 \overline{) 36} \\ \underline{36} \\ 0 \end{array}$$