

7.6 SOLVING RADICAL EQUATIONS

To solve a radical equation, you need to isolate the radical.

Example 1

Solve $\sqrt[3]{x} - 4 = 0$.



$$\begin{aligned} &+4 \quad +4 \\ (\sqrt[3]{x})^3 &= (4)^3 \\ &4 \cdot 4 \cdot 4 \end{aligned}$$

$$x = 64$$

Example 2

Solve $5\sqrt[4]{x} = 0$.

$$\frac{1\sqrt[4]{x}}{-1} = \frac{-5}{-1}$$

$$\begin{aligned} (\sqrt[4]{x})^4 &= (5)^4 \\ &5 \cdot 5 \cdot 5 \cdot 5 \end{aligned}$$



$$x = 625$$

Example 3 $X^{\frac{\text{power}}{\text{root}}}$

Solve $2x^{\frac{3}{2}} = 250$.

$$\frac{2(\sqrt{x})^3}{2} = \frac{250}{2}$$

$$\sqrt[3]{(\sqrt{x})^3} = \sqrt[3]{125}$$

$$(\sqrt{x})^2 = (5)^2$$

$$\boxed{x = 25}$$

$$\boxed{2x^{\frac{3}{2}}} = \frac{250}{2}$$

$$(x^{\frac{3}{2}}) = (125)^{\frac{2}{3}}$$

$$x = (\sqrt[3]{125})^2$$

$$x = (5)^2$$

$$\boxed{x = 25}$$

Example 4 $X^{\frac{\text{power}}{\text{root}}}$

Solve $3x^{\frac{4}{3}} = 243$.

$$(x^{\frac{4}{3}}) = (81)^{\frac{3}{4}}$$

$$x = (\sqrt[4]{81})^3$$

$$x = (3)^3$$

$$\boxed{x = 27}$$



Example 5

Solve $\sqrt{4x - 7} + 2 = 5$.

$$(\sqrt{4x - 7})^2 = (3)^2$$

$$4x - 7 = 9$$

$$\frac{4x}{4} = \frac{16}{4}$$

$$x = 4$$

Example 6

Solve $\sqrt{2x + 8} - 4 = 6$.

$$(\sqrt{2x + 8})^2 = (10)^2$$

$$2x + 8 = 100$$

$$\frac{2x}{2} = \frac{92}{2}$$

$$x = 46$$

