

Solving Power and Radical Equations - Homework

Solve each equation. Show all work.

$$1. \begin{array}{r} \sqrt{x+3}=7 \\ -3 \quad -3 \\ \hline (\sqrt{x})^2=4^2 \\ \boxed{x=16} \end{array}$$

$$2. \begin{array}{r} (\sqrt{x+2})^2=3^2 \\ x+2=9 \\ -2 \quad -2 \\ \hline \boxed{x=7} \end{array}$$

$$3. \begin{array}{r} x^{\frac{1}{2}}-3=5 \\ +3 \quad +3 \\ \hline x^{1/2}=8 \\ \sqrt{x}^2=8^2 \\ \boxed{x=64} \end{array}$$

$$4. \begin{array}{r} \frac{3\sqrt{2-x}}{3}=\frac{9}{3} \\ (\sqrt{2-x})^2=3^2 \\ 2-x=9 \\ -2 \quad -2 \\ \hline -x=7 \\ \boxed{x=-7} \end{array}$$

$$5. \begin{array}{r} \frac{2(x-1)^{1/2}}{2}=\frac{5}{2} \\ (x-1)^{1/2}=\frac{5}{2} \\ \sqrt{x-1}^2=\left(\frac{5}{2}\right)^2 \\ x-1=\frac{25}{4} \\ +1 \quad +1 \end{array}$$

$$\begin{array}{l} x = \frac{25}{4} + \frac{1 \cdot 4}{1 \cdot 4} \\ x = \frac{25}{4} + \frac{4}{4} \\ \boxed{x = \frac{29}{4}} \end{array}$$

Solve each equation. Check your solution. Not all answers will work.

$$6. \begin{array}{r} (\sqrt[3]{x})^3=(-2)^3 \\ \boxed{x=-8} \end{array}$$

$$7. \begin{array}{r} \sqrt[3]{x-2}=1 \\ +2 \quad +2 \\ \hline (\sqrt[3]{x})^3=(3)^3 \\ \boxed{x=27} \end{array}$$

$$8. \begin{array}{r} (\sqrt[3]{x-5})^3=(4)^3 \\ x-5=64 \\ +5 \quad +5 \\ \hline \boxed{x=69} \end{array}$$

$$9. \begin{array}{r} (x+4)^{1/3}+7=4 \\ -7 \quad -7 \\ \hline (x+4)^{1/3}=-3 \\ (\sqrt[3]{x+4})^3=(-3)^3 \\ x+4=-27 \\ -4 \quad -4 \\ \hline \boxed{x=-31} \end{array}$$

$$10. \begin{array}{r} \frac{4\sqrt[3]{x-6}}{4}=\frac{6}{4} \\ (\sqrt[3]{x-6})^3=\left(\frac{3}{2}\right)^3 \\ x-6=\frac{27}{8} \\ +6 \quad +6 \\ \hline x=\frac{27}{8}+\frac{6 \cdot 8}{8} \\ x=\frac{27}{8}+\frac{48}{8} \\ \boxed{x=\frac{75}{8}} \end{array}$$

$$11. \begin{array}{r} (5x+1)^{1/3}+2=7 \\ -2 \quad -2 \\ \hline \sqrt[3]{(5x+1)^{1/3}}=\sqrt[3]{5} \\ 5x+1=\sqrt[3]{5} \\ -1 \quad -1 \\ \hline \frac{5x}{5}=\frac{-1+\sqrt[3]{5}}{5} \\ \boxed{x=\frac{-1+\sqrt[3]{5}}{5}} \end{array}$$

Solve each equation. Check your solution. Not all answers will work.

$$12. (\sqrt[3]{x-3})^3 = \left(\frac{1}{2}\right)^3$$

$$x-3 = \frac{1}{8}$$

$$\begin{array}{r} +3 \quad +3 \\ \hline \end{array}$$

$$x = \frac{1}{8} + \frac{3 \cdot 8}{1 \cdot 8}$$

$$x = \frac{1}{8} + \frac{24}{8}$$

$$\boxed{x = \frac{25}{8}}$$

$$13. (x^{2/3})^{3/2} = (16)^{3/2}$$

$$x = \pm \sqrt{16}^3$$

$$x = \pm 4^3$$

$$\boxed{x = \pm 64}$$

$$14. (\sqrt{x+3})^2 = (\sqrt{7})^2$$

$$x+3 = 49$$

$$\begin{array}{r} -3 \quad -3 \\ \hline \end{array}$$

$$\boxed{x = 46}$$

$$15. x^{3/4} - 9 = 18$$

$$\begin{array}{r} +9 \quad +9 \\ \hline \end{array}$$

$$(x^{3/4})^{4/3} = (27)^{4/3}$$

$$x = \sqrt[3]{27}^4$$

$$x = 3^4$$

$$\boxed{x = 81}$$

$$16. (\sqrt[3]{3x+2})^3 = (\sqrt[3]{x+5})^3$$

$$3x+2 = x+5$$

$$\begin{array}{r} -x \quad -2 \quad -x-2 \\ \hline \end{array}$$

$$\frac{2x}{2} = \frac{3}{2}$$

$$\cancel{x = \frac{3}{2}} \text{ ext.}$$

No Solution!

$$17. (\sqrt[4]{3x-5})^4 = (\sqrt[4]{5x-8})^4$$

$$3x-5 = 5x-8$$

$$\begin{array}{r} -3x+8 \quad -3x+8 \\ \hline \end{array}$$

$$\frac{3}{2} = \frac{2x}{2}$$

$$\cancel{\frac{3}{2} = x} \text{ ext.}$$

No Solution!