

## 7.6 Solving equations of Radicals

$$\sqrt{x} = 3 \quad (\sqrt{x})^2 = 3^2$$
$$x = 9 \quad x = 9$$

$$\sqrt[3]{x} = 4 \quad \sqrt[4]{x} = 2$$
$$(\sqrt[3]{x})^3 = 4^3 \quad x = 2^4$$
$$x = 64 \quad x = 16$$

$$\sqrt{x+2} = 5 \quad (\sqrt{x+2})^2 = \sqrt{x+2} \sqrt{x+2}$$
$$(\sqrt{x+2})^2 = 5^2 \quad \sqrt{(x+2)(x+2)} = x+2$$
$$x+2 = 25$$
$$\begin{array}{r} -2 \quad -2 \\ \hline x = 23 \end{array}$$

check your answers!

$$\sqrt[3]{x-1} = 3 \quad \sqrt[3]{28-1} = 3$$
$$(\sqrt[3]{x-1})^3 = 3^3 \quad \sqrt[3]{27} = 3$$
$$x-1 = 27 \quad 3 = 3 \quad \checkmark$$
$$\boxed{x = 28}$$

$$\underbrace{2\sqrt{x-4}}_{-4} + \underbrace{6}_{-4} = 12$$

$$12^2 = (2\sqrt{x-4} + 6)(2\sqrt{x-4} + 6)$$

$$\frac{2\sqrt{x-4}}{2} = \frac{6}{2}$$

$$\sqrt{x-4} = 3$$
$$x-4 = 9$$
$$\begin{array}{r} +4 \quad +4 \\ \hline x = 13 \end{array}$$

$$\sqrt{x-4} = \sqrt{3x+1}$$

$$(\sqrt{x-4})^2 = (\sqrt{3x+1})^2$$

$$x-4 = 3x+1$$

$$-4 = 2x+1$$

$$\frac{5}{2} = 0x$$

$$\frac{-5}{2} = x$$

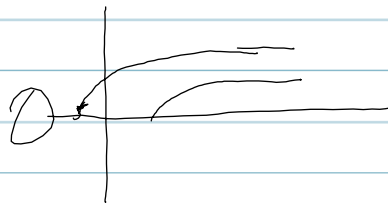
check

$$\sqrt{\frac{-5}{2}-4} = \sqrt{3\left(\frac{-5}{2}\right)+1}$$

$$\sqrt{\frac{-5-8}{2}} = \sqrt{\frac{-15+2}{2}}$$

$$\sqrt{\frac{-13}{2}} = \sqrt{\frac{-13}{2}}$$

no solution



Bonus  
type

748  $\sqrt{x-2} + 3 = \sqrt{4x+1}$

$$(\sqrt{x-2} + 3)(\sqrt{x-2} + 3) - (\sqrt{4x+1})^2$$

$$(x-2) + 3\sqrt{x-2} + 3\sqrt{x-2} + 9 = 4x+1$$

$$6\sqrt{x-2} = 4x+1-x+2-9$$

$$\frac{6\sqrt{x-2}}{3} = \frac{3x-6}{3}$$

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

$$4(x-2) = x^2 - 4x + 4$$

$$4x-8 = x^2 - 4x + 4$$

$$0 = x^2 - 8x + 12$$

$$(x-6)(x-2)$$

$$x-6=0 \quad x-2=0$$

$$x=6 \quad x=2$$

$$\sqrt{6-2} + 3 = \sqrt{4(6)+1}$$

$$\sqrt{4} + 3 = \sqrt{25}$$

$$2 + 3 = 5$$

$$\sqrt{5} = 5$$

$$\sqrt{2-2} + 3 = \sqrt{4(2)+1}$$

$$0 + 3 = \sqrt{9}$$

$$\sqrt{3} = 3$$