

Sec. 10.2 Solve Equations by Using Square Roots

Solve each equation.

$\sqrt{\quad} \rightarrow$ inverse of 2

a. $x^2 = 36$

$$\hookrightarrow x = \sqrt{36} \text{ or } x = -\sqrt{36}$$

$$x = \pm \sqrt{36}$$

$$x = \pm 6$$

b. $x^2 = 15$

$$x = \sqrt{15} \text{ or } x = -\sqrt{15}$$

$$x = \pm \sqrt{15}$$

c. $x^2 = \frac{36}{25}$

$$x = \pm \sqrt{\frac{36}{25}} = \boxed{\pm \frac{6}{5}}$$

d. $x^2 = 24$

$$x = \pm \sqrt{24}$$

$$= \pm 2\sqrt{6}$$

$$\approx \pm 4.90$$

1
4
9
16
25
36
49
64
81
100
121
144
169

$$\begin{aligned}
 e. \quad & \frac{(x+4)^2 - 25 = 0}{+25 \quad +25} \\
 & (x+4)^2 = 25 \\
 & \sqrt{(x+4)^2} = \pm \sqrt{25} \text{ (5)} \\
 & \begin{array}{r} x+4 = \pm 5 \\ -4 \quad -4 \\ \hline x = -4 \pm 5 \end{array} \left\{ \begin{array}{l} -4+5 = 1 \\ -4-5 = -9 \end{array} \right.
 \end{aligned}$$

$$\begin{aligned}
 f. \quad & \frac{(x-4)^2 - 81 = 0}{+81 \quad +81} \\
 & (x-4)^2 = 81 \\
 & \sqrt{(x-4)^2} = \pm \sqrt{81} \\
 & \begin{array}{r} x-4 = \pm 9 \\ +4 \quad +4 \\ \hline x = 4 \pm 9 \end{array} \left\{ \begin{array}{l} 4+9 = 13 \\ 4-9 = -5 \end{array} \right.
 \end{aligned}$$

$$\begin{aligned}
 g. \quad & \frac{25 \left(t - \frac{2}{5}\right)^2 - 144 = 0}{+144 \quad +144} \\
 & \frac{25 \left(t - \frac{2}{5}\right)^2}{25} = \frac{144}{25} \\
 & \left(t - \frac{2}{5}\right)^2 = \frac{144}{25} \\
 & \sqrt{\left(t - \frac{2}{5}\right)^2} = \pm \sqrt{\frac{144}{25}} = \pm \frac{12 \cdot 12}{5 \cdot 5} \\
 & t - \frac{2}{5} = \pm \frac{12}{5} \\
 & \begin{array}{r} +\frac{2}{5} \quad +\frac{2}{5} \\ \hline t = \frac{2}{5} \pm \frac{12}{5} \end{array} \left\{ \begin{array}{l} \frac{2}{5} + \frac{12}{5} = \frac{14}{5} \\ \frac{2}{5} - \frac{12}{5} = \frac{-10}{5} \\ = -2 \end{array} \right.
 \end{aligned}$$

