

C11 - 4.3 - Solving by Square Root Method Notes

$$\begin{aligned}
 x^2 - 4 &= 0 \\
 +4 \quad +4 \\
 x^2 &= 4 \\
 \sqrt{x^2} &= \pm\sqrt{4} \\
 x &= \pm 2
 \end{aligned}$$

$$x = 2 \quad x = -2$$

$$\begin{aligned}
 x^2 - 4 &= 0 \\
 (x + 2)(x - 2) &= 0 \\
 x + 2 &= 0 \quad x - 2 = 0 \\
 x &= -2 \quad x = 2
 \end{aligned}$$

$$\begin{aligned}
 2(x + 1)^2 - 8 &= 0 \\
 +8 \quad +8 \\
 2(x + 1)^2 &= 8 \\
 \frac{2(x + 1)^2}{2} &= \frac{8}{2} \\
 (x + 1)^2 &= 4 \\
 \sqrt{(x + 1)^2} &= \pm\sqrt{4} \\
 x + 1 &= \pm 2
 \end{aligned}$$

$$\begin{aligned}
 x + 1 &= 2 & x + 1 &= -2 \\
 -1 \quad -1 & & -1 \quad -1 &
 \end{aligned}$$

$$x = 1$$

$$x = -3$$

$$x = \sqrt{7} + 2 \quad x = -\sqrt{7} + 2$$

$$\begin{aligned}
 2\left(x + \frac{1}{2}\right)^2 - 8 &= 0 \\
 2\left(x + \frac{1}{2}\right)^2 &= 8 \\
 \left(x + \frac{1}{2}\right)^2 &= 4 \\
 \sqrt{\left(x + \frac{1}{2}\right)^2} &= \pm\sqrt{4} \\
 x + \frac{1}{2} &= \pm 2 \\
 x &= \pm 2 - \frac{1}{2}
 \end{aligned}$$

$$x = 1.5$$

$$x = -2.5$$

$$\begin{aligned}
 (x - 2)^2 - 1 &= 0 \\
 +1 \quad +1 \\
 (x - 2)^2 &= 1 \\
 \sqrt{(x - 2)^2} &= \pm\sqrt{1} \\
 x - 2 &= \pm 1
 \end{aligned}$$

$$x - 2 = 1 \quad x - 2 = -1$$

$$x = 3 \quad x = 1$$

$$\begin{aligned}
 (x - 2)^2 - 1 &= 0 \\
 (x - 2)(x - 2) - 1 &= 0 \\
 x^2 - 4x + 4 - 1 &= 0 \\
 x^2 - 4x + 3 &= 0 \\
 (x - 1)(x - 3) &= 0 \\
 x - 1 &= 0 \quad x - 3 = 0 \\
 x &= 1 \quad x = 3
 \end{aligned}$$

$$\begin{aligned}
 (x - 2)^2 - 7 &= 0 \\
 +7 \quad +7 \\
 (x - 2)^2 &= 7 \\
 \sqrt{(x - 2)^2} &= \pm\sqrt{7} \\
 x - 2 &= \pm\sqrt{7} \\
 x &= \pm\sqrt{7} + 2
 \end{aligned}$$

$$\begin{aligned}
 x^2 + 16 &= 0 \\
 -16 \quad -16 \\
 x^2 &= -16 \\
 \sqrt{x^2} &= \pm\sqrt{-16}
 \end{aligned}$$

DNE

Can't square root a negative.

$$\begin{aligned}
 (x + 2)^2 + 2 &= 0 \\
 -2 \quad -2 \\
 (x + 2)^2 &= -2 \\
 \sqrt{(x + 2)^2} &= \pm\sqrt{-2}
 \end{aligned}$$

DNE

$$\begin{aligned}
 \left(x - \frac{1}{2}\right)^2 - 7 &= 0 \\
 \left(x - \frac{1}{2}\right)^2 &= 7 \\
 x - \frac{1}{2} &= \pm\sqrt{7} \\
 x &= \pm\sqrt{7} + \frac{1}{2} \\
 x &= \pm\sqrt{7} \times \frac{2}{2} + \frac{1}{2} \\
 x &= \frac{\pm 2\sqrt{7}}{2} + \frac{1}{2}
 \end{aligned}$$

$$\begin{aligned}
 2(x - 2)^2 - 7 &= 0 \\
 2(x - 2)^2 &= 7
 \end{aligned}$$

$$\begin{aligned}
 \sqrt{(x - 2)^2} &= \pm\sqrt{\frac{7}{2}} \\
 x - 2 &= \pm\sqrt{\frac{7}{2}} \\
 x &= \pm\sqrt{\frac{7}{2}} + 2 \\
 x &= \pm\frac{\sqrt{7}}{\sqrt{2}} + \frac{2\sqrt{2}}{\sqrt{2}} \\
 x &= \frac{\pm\sqrt{7} + 2\sqrt{2}}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}
 \end{aligned}$$

$$x = \frac{\pm\sqrt{14} + 4}{2}$$

$$2\left(x - \frac{2}{3}\right)^2 - 7 = 0 \quad x = \frac{\pm 2\sqrt{7} + 1}{2}$$

$$\begin{aligned}
 2\left(x - \frac{2}{3}\right)^2 &= 7 \\
 \sqrt{\left(x - \frac{2}{3}\right)^2} &= \pm\sqrt{\frac{7}{2}} \\
 x - \frac{2}{3} &= \pm\sqrt{\frac{7}{2}} \\
 x &= \pm\sqrt{\frac{7}{2}} + \frac{2}{3} \\
 x &= \pm\frac{\sqrt{7}}{\sqrt{2}} \times \frac{3}{3} + \frac{2}{3} \times \frac{\sqrt{2}}{\sqrt{2}} \\
 x &= \frac{\pm 3\sqrt{7} + 2\sqrt{3}}{3\sqrt{2}}
 \end{aligned}$$

$$x = \frac{\pm 3\sqrt{14} + 2\sqrt{6}}{6}$$

Rationalize