

## Using Radicals to Solve Equations

1.  $x^2(x + 7) = \frac{1}{2}(14x^2 + 16)$

2.  $x^3 = 1331^{-1}$

3.  $x^3 + 9x = \frac{1}{2}(18x + 54)$

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## Using Radicals to Solve Equations

1.  $x^2(x + 7) = \frac{1}{2}(14x^2 + 16)$

$$\begin{aligned}x^2(x + 7) &= \frac{1}{2}(14x^2 + 16) \\x^3 + 7x^2 &= 7x^2 + 8 \\x^3 + 7x^2 - 7x^2 &= 7x^2 - 7x^2 + 8 \\x^3 &= 8 \\\sqrt[3]{x^3} &= \sqrt[3]{8} \\x &= 2\end{aligned}$$

**Check:**

$$\begin{aligned}2^2(2 + 7) &= \frac{1}{2}(14(2^2) + 16) \\4(9) &= \frac{1}{2}(56 + 16) \\36 &= \frac{1}{2}(72) \\36 &= 36\end{aligned}$$

2.  $x^3 = 1331^{-1}$

$$\begin{aligned}x^3 &= 1331^{-1} \\\sqrt[3]{x^3} &= \sqrt[3]{1331^{-1}} \\x &= \sqrt[3]{\frac{1}{1331}} \\x &= \sqrt[3]{\frac{1}{11^3}} \\x &= \frac{1}{11}\end{aligned}$$

**Check:**

$$\begin{aligned}\left(\frac{1}{11}\right)^3 &= 1331^{-1} \\\frac{1}{11^3} &= 1331^{-1} \\\frac{1}{1331} &= 1331^{-1} \\1331^{-1} &= 1331^{-1}\end{aligned}$$

3.  $x^3 + 9x = \frac{1}{2}(18x + 54)$

$$\begin{aligned}x^3 + 9x &= \frac{1}{2}(18x + 54) \\x^3 + 9x &= 9x + 27 \\x^3 + 9x - 9x &= 9x - 9x + 27 \\x^3 &= 27 \\\sqrt[3]{x^3} &= \sqrt[3]{27} \\x &= \sqrt[3]{3^3} \\x &= 3\end{aligned}$$

$$\begin{aligned}3^3 + 9(3) &= \frac{1}{2}(18(3) + 54) \\27 + 27 &= \frac{1}{2}(54 + 54) \\54 &= \frac{1}{2}(108) \\54 &= 54\end{aligned}$$

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