

Solving Radical Equations

STEPS TO SOLVE

$$9 + \sqrt{9 - x} = 11$$

-9

-9

① Subtract 9 from both sides to **Isolate Radical**

$$\sqrt{9 - x} = 2$$

② Square both sides to **cancel Radical**

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

③ Simplify

[solve for x]

$$9 - x = 4$$

④ subtract 9

$$-x = -5$$

⑤ Divide by -1

$$x = 5$$

⑥ **Check for extraneous solutions**

* If x does not provide a true statement there is no solution \rightarrow extraneous!

$$\begin{aligned} \text{Check: } 9 + \sqrt{9 - 5} &= 11 \\ 9 + \sqrt{4} &= 11 \\ 9 + 2 &= 11 \\ 11 &= 11 \checkmark \end{aligned}$$

Name:

Period:

Date:

Practice Worksheet: Solving Radical Equations

Solve each radical equation. None of these problems will have extraneous solutions. You must show work and your answers must be correct to get credit.

Level 1	Level 2	Level 3
1) $\sqrt{x} + 3 = 12$ $\sqrt{x} = 9$ $x = 81$	6) $-6 = \sqrt{x-25} - 8$ $2 = \sqrt{x-25}$ $4 = x-25$ $x = 29$	11) $2\sqrt{3x+7} - 1 = 7$ $2\sqrt{3x+7} = 8$ $\sqrt{3x+7} = 4$ $3x+7 = 16$ $3x = 9$ $x = 3$
2) $\sqrt[3]{x} - 10 = -3$ $\sqrt[3]{x} = 7$ $x = 343$	7) $\sqrt[3]{x-16} + 4 = 6$ $\sqrt[3]{x-16} = 2$ $x-16 = 8$ $x = 24$	12) $-4\sqrt{x+10} + 3 = 15$ $-4\sqrt{x+10} = 12$ $\sqrt{x+10} = -3$ $x+10 = -27$ $x = -37$
3) $\sqrt{4x+1} = \sqrt{x+10}$ $4x+1 = x+10$ $3x = 9$ $x = 3$	8) $\sqrt[3]{12x-5} = \sqrt[3]{8x+15}$ $12x-5 = 8x+15$ $4x = 20$ $x = 5$	13) $\sqrt[3]{3x-11} = \sqrt[3]{5-x}$ $3x-11 = 5-x$ $4x = 16$ $x = 4$
4) $(3x-4)^{1/3} = 2$ $3x-4 = 8$ $3x = 12$ $x = 4$	9) $(x-5)^{5/3} - 73 = 170$ $(x-5)^{5/3} = 243$ $\sqrt[3]{(x-5)^5} = 243$ $(x-5)^5 = 14348907$ $x-5 = 27$ $x = 32$	14) $\frac{1}{7}(x+9)^{3/2} = 49$ $\sqrt{(x+9)^3} = 343$ $(x+9)^3 = 117649$ $x+9 = 49$ $x = 40$
5) $x^{2/3} + 45 = 70$ $\sqrt[3]{x^2} = 25$ $x^2 = 15625$ $x = 125$	10) $5(x-4)^{4/3} = 80$ $(x-4)^{4/3} = 16$ $\sqrt[3]{(x-4)^4} = 16$ $(x-4)^4 = 4096$ $x-4 = 8$ $x = 12$	15) $10(x-5)^{2/5} - 25 = 15$ $10(x-5)^{2/5} = 40$ $(x-5)^{2/5} = 4$ $\sqrt[5]{(x-5)^2} = 4$ $(x-5)^2 = 1024$

$$x - 5 = 32$$

$$x = 37$$

* Had to pick 3 from each column.