Solving Radical Equations

1. $\sqrt{4x+8}+9=11$

$-9 \quad -9$

$(\sqrt{4x+8})^2=(2)^2$

$4x+8=4$

$4x=-4$

$\boxed{x=-1}$

check ✓

$\sqrt{4(-1)+8}+9=11$

$\sqrt{-4+8}+9=11$

$\sqrt{4}+9=11$

$2+9=11$ ✓

11

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2. $(\sqrt{5x-7})^2=(\sqrt{6x+2})^2$

$5x-7=6x+2$

$-x-7=2$

$-x=9$

$\boxed{x=-9}$

Check ✓

$\sqrt{(5(-9)-7)}=\sqrt{(6(-9)+2}$

$\sqrt{(-45-7)}=\sqrt{-54+2}$

$\sqrt{-52}=\sqrt{-52}$

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3. $x - x\sqrt{7} = 3$

$\frac{x(1-\sqrt{7})}{1-\sqrt{7}} = \frac{3}{1-\sqrt{7}}$

conjugate

$x = \frac{3}{1-\sqrt{7}} \cdot \frac{(1+\sqrt{7})}{(1+\sqrt{7})}$

$x = \frac{3+3\sqrt{7}}{1+\sqrt{7}-\sqrt{7}-7}$

$x = \frac{3+3\sqrt{7}}{-6}$

$\boxed{x = \frac{1+\sqrt{7}}{-2}}$

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4. $-2\sqrt{9x+5} - 9 = -21$

$\frac{-2\sqrt{9x+5}}{-2} = \frac{-12}{-2}$

$\left(\sqrt{9x+5}\right)^2 = (6)^2$

$9x+5 = 36$

$-5 \quad -5$

$\frac{9x}{9} = \frac{31}{9}$

$\boxed{x = \frac{31}{9}}$

Check ✓

$-2\sqrt{9(31/9)+5} - 9 = -21$

$-2\sqrt{31+5} - 9 = -21$

$-2\sqrt{36} - 9 = -21$

$-2(6) - 9 = -21$

$-21 = -21$ ✓

11

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5. $\sqrt[3]{x-1}+4=3$

$(\sqrt[3]{x-1})^3=(-1)^3$

$x-1=-1$

$x=0$

Check ✓

$\sqrt[3]{0-1}=-1$

$\sqrt[3]{-1}=-1$ ✓

$-1=-1$ ✓

!!

☺

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* Keep in mind.... can't take $\sqrt{\ }$ ~~of a~~, & get a negative #

ex: $\sqrt{3x-1}=-2$

$\varnothing$ no solution

* you can take $\sqrt[3]{\ }$ & get a negative #

ex: $\sqrt[3]{-8}=-2$

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