Solving Radical Equations

① $\sqrt{x} - 7 = 0$

$ +7 +7$

$(\sqrt{x})^2 = (7)^2$

$\boxed{x = 49}$

check!

$\sqrt{49} - 7 = 0$

$7 - 7 = 0$

$0 = 0 \checkmark$

② $2\sqrt{x} - 8 = 0$

$ +8 +8$

$\dfrac{2\sqrt{x}}{2} = \dfrac{8}{2}$

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

$\boxed{x = 16}$

Check!

$2\sqrt{16} - 8 = 0$

$2 \cdot 4 - 8 = 0$

$8 - 8 = 0$

$0 = 0 \checkmark$

③ $12\sqrt{x} - 3 = 0$

$ +3 +3$

$\dfrac{12\sqrt{x}}{12} = \dfrac{3}{12}$

$(\sqrt{x})^2 = \left(\dfrac{1}{4}\right)^2$

$\boxed{x = \dfrac{1}{16}}$

check!

$12\sqrt{\dfrac{1}{16}} - 3 = 0$

$12 \cdot \dfrac{1}{4} - 3 = 0$

$\dfrac{12}{4} - 3 = 0$

$3 - 3 = 0$

$0 = 0 \checkmark$

④ $4\sqrt{x-7} + 12 = 28$

$ -12 -12$

$\dfrac{4\sqrt{x-7}}{4} = \dfrac{16}{4}$

$(\sqrt{x-7})^2 = 4^2$

$x - 7 = 16$

$ +7 +7$

$\boxed{x = 23}$

check!

$4\sqrt{23-7} + 12 = 28$

$4\sqrt{16} + 12 = 28$

$4 \cdot 4 + 12 = 28$

$16 + 12 = 28$

$28 = 28 \checkmark$

⑤ $2\sqrt{x+6} + 9 = 21$

$ -9 -9$

$\dfrac{2\sqrt{x+6}}{2} = \dfrac{12}{2}$

$(\sqrt{x+6})^2 = 6^2$

$x + 6 = 36$

$ -6 -6$

$\boxed{x = 30}$

check!

$2\sqrt{30+6} + 9 = 21$

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

$2 \cdot 6 + 9 = 21$

$12 + 9 = 21$

$21 = 21 \checkmark$

⑥ $\sqrt{x-5} + 7 = 12$

$ -7 -7$

$(\sqrt{x-5})^2 = 5^2$

$x - 5 = 25$

$ +5 +5$

$\boxed{x = 30}$

check!

$\sqrt{30-5} + 7 = 12$

$\sqrt{25} + 7 = 12$

$5 + 7 = 12$

$12 = 12 \checkmark$