

FIND ALL REAL SOLUTIONS OF THE EQUATIONS:

$$\sqrt{13-x} = x-1$$

check  $x=4$

$$(\sqrt{13-x})^2 = (x-1)^2$$

$$\begin{aligned} \sqrt{13-4} &\stackrel{?}{=} 4-1 \\ \sqrt{9} &\stackrel{?}{=} 3 \\ 3 &= 3 \checkmark \end{aligned}$$

$$\begin{aligned} 13-x &= x^2-2x+1 \\ -13+x &\quad +x-13 \end{aligned}$$

$$x^2-x-12=0$$

$$(x-4)(x+3)=0$$

$$x-4=0 \Rightarrow \boxed{x=4}$$

$$x+3=0 \Rightarrow x=-3 \text{ EXTRANEOUS}$$

$$\begin{aligned} x &= -3 \\ \sqrt{13+3} &= -3-1 \\ \sqrt{16} &\neq -4 \end{aligned}$$

$$\sqrt[4]{2x-9} - 3 = 0$$

check  $x=45$

$$(\sqrt[4]{2x-9})^4 = (3)^4$$

$$\sqrt[4]{2 \cdot 45 - 9} - 3 \stackrel{?}{=} 0$$

$$\begin{aligned} 2x-9 &= 81 \\ +9 &+9 \end{aligned}$$

$$\sqrt[4]{90-9} - 3 \stackrel{?}{=} 0$$

$$2x=90$$

$$\boxed{x=45}$$

$$\sqrt[4]{81} - 3 = 0$$

$$3 - 3 = 0$$

$$0 = 0 \checkmark$$

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

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

$$x-2 = x^2-8x+16$$

$$x^2-9x+18=0$$

$$(x-3)(x-6)=0$$

$$\cancel{x=3} \quad x=6$$

check  $x=3$  EXTRANEOUS

$$3 - \sqrt{3-2} \stackrel{?}{=} 4$$

$$3 - \sqrt{1} \stackrel{?}{=} 4$$

$$3 - 2 \stackrel{?}{=} 4$$

$$2 \neq 4$$

$$\begin{aligned} x &= 6 \\ 6 - \sqrt{6-2} &\stackrel{?}{=} 4 \end{aligned}$$

$$6 - \sqrt{4} \stackrel{?}{=} 4$$

$$6 - 2 \stackrel{?}{=} 4$$

$$4 = 4 \checkmark$$