Do you think that there could be extraneous solutions for this equation?

Probably not because there is no restriction on either the Domain or Range of a cube root.

$$\left(\sqrt[3]{x^2-7}\right)^3=\left(\sqrt[3]{x-1}\right)^3$$

Solve.

$x^2-7=x-1$

$x^2-x-6=0$

$(x-3)(x+2)=0$

$-6,\ 2,\ -3,\ -1$

$x=3,-2$

Solve.

$$\left(\sqrt{x+6}\right)^2=\left(5\sqrt{x-12}\right)^2$$

$x+6=25(x-12)$

$x+6=25x-300$

$306=24x$

$\boxed{x=12.75}$

Solve.

$$\left[(x+2)^{\frac{1}{2}}\right]^2=\left[6(x-3)^{-\frac{1}{2}}\right]^2$$

$x+2=36(x-3)^{-1}$

$\dfrac{x+2}{1}=\dfrac{36}{x-3}\implies (x+2)(x-3)=36$

$x^2-x-6=36$

$-36\quad -36$

$x^2-x-42=0$

$-42,\ -7,\ 6,\ -1$

$(x-7)(x+6)=0$

$x=7,\cancel{-6}$

$x=7$

Solve.

$$(x+13)^{\frac{1}{4}}-(x+1)^{\frac{1}{2}}=0$$

$+(x+1)^{1/2}\qquad +(x+1)^{1/2}$

$\left[(x+13)^{1/4}\right]^4=\left[(x+1)^{1/2}\right]^4$

$x+13=(x+1)^2$

$x+13=x^2+2x+1$

$0=x^2+x-12$

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

$-12,\ -3,\ 4,\ 1$

$x=3,\cancel{-4}$

Solve.

$$\left[(x-2)^{\frac{4}{3}}\right]^6 = \left[(7)^{\frac{5}{6}}\right]^6$$

$$(x-2)^8 = 7^5$$

$$\sqrt[8]{(x-2)^8} = \sqrt[8]{16807}$$

$$\underset{+2}{x-2} = \underset{+2}{3.37}$$

$$\boxed{x \approx 5.37}$$

Solve. $\left(\sqrt{\sqrt{x+25}}\right)^2 = \left(\sqrt{x+5}\right)^2$

$$\left(\sqrt{x+25}\right)^2 = (x+5)^2$$

$$x+25 = x^2+10x+25$$

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

$$0 = x(x+9)$$

$$x = 0, \cancel{-9}$$

$$x=0$$

How could you figure out what x equals?

$$(x)^2 = \left(\sqrt{2+\sqrt{2+\sqrt{2+\ldots}}}\right)^2$$

$$x^2 = 2 + \sqrt{2+\sqrt{2+\ldots}}$$

$$x^2 = 2 + x$$

From the original problem this is what x =

$x = \sqrt{2+\sqrt{2+\sqrt{2+\ldots}}}$

so substitute x in the place of

$\sqrt{2+\sqrt{2+\ldots}}$

and keep solving

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

$$(x-2)(x+1) = 0$$

$$x = 2, \cancel{-1}$$

$$\boxed{x = 2}$$

You can now finish Hwk #11 Sec 7-5

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Problems 6, 7, 9, 17, 18, 21-23, 54

Solve.

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

	$\sqrt{x-8}$	$+2$
$\sqrt{x-8}$	$x-8$	$2\sqrt{x-8}$
$+2$	$2\sqrt{x-8}$	$+4$

$$x = 4\sqrt{x-8} + x - 4$$

$$-x \qquad\qquad -x$$

$$0 = 4\sqrt{x-8} - 4$$

$$+4 \qquad\qquad +4$$

$$\frac{4}{4} = \frac{4\sqrt{x-8}}{4} \longrightarrow (1)^2 = (\sqrt{x-8})^2$$

$$1 = x - 8$$

$$+8 \qquad +8$$

$$x = 9$$