problem: $\boxed{\left(x-\frac{1}{x}\right)^{1/2} + \left(1-\frac{1}{x}\right)^{1/2} = x}$

$$\left(\frac{x^2-1}{x}\right)^{1/2} + \left(\frac{x-1}{x}\right)^{1/2} = x = \frac{\sqrt{x^2-1}}{\sqrt{x}} + \frac{\sqrt{x-1}}{\sqrt{x}}$$

$$x\sqrt{x} = \sqrt{x^2-1} + \sqrt{x-1}$$

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

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

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

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

$\boxed{\text{notice } (\sqrt{x}\sqrt{x-1})^2 = x(x-1) = (x^2-x) \quad \text{so} \rightarrow \sqrt{x}\sqrt{x-1} = \sqrt{x^2-x}}$

$$x^2 - x + 1 = 2\sqrt{x}\sqrt{x-1}$$

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

$$1 = 2\sqrt{x^2-x} - (x^2-x)$$ ← Quadradic we are after

$$0 = -(x^2-x) + 2\sqrt{x^2-x} - 1$$

$$-b^2 + 2b - 1 \quad \text{with } b = \sqrt{x^2-x}$$

$\boxed{\frac{-b \pm \sqrt{b^2-4ac}}{2a} \quad a=-1,\ b=2,\ c=-1 \qquad \frac{-2 \pm \sqrt{4-4(-1)(-1)}}{2(-1)} = \frac{-2}{-2} = 1}$

so root at $b=1$ $\left[1 = \sqrt{x^2-x}\right]$ so $\left[1 = x^2-x\right]$

This gives another quadratic $a=1$, $b=-1$, $c=-1$

$$0 = x^2 - x - 1$$

$\boxed{\frac{1 \pm \sqrt{1-4(-1)}}{2} \Rightarrow \frac{1\pm\sqrt{5}}{2}}$

Checking solution and determining (+) or (−) for second quadratic.

$$\left(\frac{1\pm\sqrt{5}}{2}\right)^2 \overset{(+)}{=} \frac{1+2\sqrt{5}+5}{4} = \frac{6+2\sqrt{5}}{4} = \left(\frac{3+\sqrt{5}}{2}\right)$$

$$\overset{(-)}{=} \frac{1-2\sqrt{5}+5}{4} = \frac{6-2\sqrt{5}}{4} = \left(\frac{3-\sqrt{5}}{2}\right)$$

using (−) → $\left[\left(\frac{3-\sqrt{5}}{2}\right) - \left(\frac{1-\sqrt{5}}{2}\right) - 1 = 0\right] \Rightarrow 3 - \cancel{\sqrt{5}} - 1 + \cancel{\sqrt{5}} - 2 = 0$

$\boxed{3 - 1 - 2 = 0}$ Valid soln for # 2

B

$$\left(\frac{1-\sqrt{5}}{2} - \frac{2}{1-\sqrt{5}}\right)^{1/2} + \left(1 - \frac{2}{1-\sqrt{5}}\right)^{1/2} = X$$

$$(1-\sqrt{5})^2 \quad 1 - 2\sqrt{5} + 5 = (6 - 2\sqrt{5}) \quad =$$

$$\frac{(6-2\sqrt{5}) - 4}{2(1-\sqrt{5})} + \left(\frac{1-\sqrt{5}-2}{1-\sqrt{5}}\right)^{1/2} =$$

$$\frac{2-2\sqrt{5}}{2(1-\sqrt{5})} \quad \left(\frac{-1-\sqrt{5}}{1-\sqrt{5}}\right)^{1/2} =$$

$$\cancel{\left(\frac{1-\sqrt{5}}{1-\sqrt{5}}\right)}$$

$$1 + \left(\frac{-1-\sqrt{5}}{1-\sqrt{5}}\right)^{1/2} = \frac{1-\sqrt{5}}{2}$$

$$\left(\frac{-1-\sqrt{5}}{1-\sqrt{5}}\right) = \left(\frac{1-\sqrt{5}}{2} - 1\right)^2$$

$$\frac{-1-\sqrt{5}}{1-\sqrt{5}} = \frac{6-2\sqrt{5}}{4} - \frac{\cancel{2}(1-\sqrt{5})}{\cancel{2}} + 1$$

$$\frac{6}{4} - \frac{2}{4}\sqrt{5} - 1 + \sqrt{5} + 1$$

$$= \frac{3}{2} - \frac{1}{2}\sqrt{5} + \sqrt{5}$$

$$(-1-\sqrt{5}) = \left(\frac{3}{2} + \frac{1}{2}\sqrt{5}\right)(1-\sqrt{5})$$

$$\frac{3}{2} - \frac{3\sqrt{5}}{2} + \frac{\sqrt{5}}{2} - \frac{5}{2}$$

$$\frac{3}{2} - \frac{\cancel{2}\sqrt{5}}{\cancel{2}} - \frac{5}{2}$$

$$-\frac{2}{2} - \sqrt{5}$$

$$(-1-\sqrt{5}) = (-1-\sqrt{5})$$