## What is the value of $x$ in $x+1=x$

I could just give you an answer in one line but I would rather EXPLAIN what is strange about equations like this.

I will solve a "normal" linear equation first.

$$
\mathbf{7}(\mathbf{x}-\mathbf{3})=\mathbf{5}(\mathbf{x}+\mathbf{5}) \quad \text { Line } 1
$$

If Line 1 is true then: $\mathbf{7 x}-\mathbf{2 1}=\mathbf{5} \mathbf{x}+\mathbf{2 5} \quad$ Line 2
If Line 2 is true then: $7 \mathbf{x} \quad \mathbf{5 x}+\mathbf{4 6}$ Line 3
If Line 3 is true then: $\mathbf{2 x}=\mathbf{4 6}$ Line 4
If Line 4 is true then: $\mathbf{x}=\mathbf{2 3}$ Line 5
The solution $\mathbf{x}=\mathbf{2 3}$ has to fit every line for every line to be true.
NOW look at this equation:

$$
\mathbf{2}(\mathbf{x}+\mathbf{3})=\mathbf{2}(x+5) \quad \text { Line } 1
$$

If Line 1 is true then: $\quad \mathbf{2 x}+\mathbf{6}=\mathbf{2 x}+\mathbf{1 0} \quad$ Line 2
If Line 2 is true then: $\mathbf{2 x}=\mathbf{2 x}+\mathbf{4}$ Line 3
If Line 3 is true then: $\mathbf{0}=\mathbf{4}$ Line 4
BUT of course $\mathbf{0} \neq \mathbf{4}$ so this logic goes backwards too!
Line 4 is false
So Line 3 is false
So Line 2 is false
So Line 1 is false which means the original equation does not have any solution.

Now we can make some sense out of your equation.

> then (subtracting $\mathbf{x}$ from both sides) $\quad \mathbf{1}=\mathbf{0}$ which is not true and this means the original equation cannot be true either. There is no solution.

If $\mathbf{x}+\mathbf{1}=\mathbf{x}$ is true

