Math Diversion Problem 301

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> The greatest killer of creativity is interruption.
> — John Cleese

The YouTube video is found at:

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Source: https://www.youtube.com/watch?v=NLT1vLIJjI0
Title: Can you Pass Harvard University Admission Interview ?
 Presenter: Super Academy
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1 The Problem

Given the relation

$$\sqrt{x} + \sqrt{-x} = 36\,, \tag{1}$$

find the values of x.

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2 The Solution

Note: $(1+i)(1-i) = 2$ and $(1-i)^2 = -2i$.

First, we should factor$\sqrt{-x}$ to $i\sqrt{x}$, then the Given relation becomes

$$\sqrt{x} + i\sqrt{x} = \sqrt{x}(1+i) = 36\,. \tag{2}$$

On multiplying this through by $(1-i)/2$, we get

$$\sqrt{x} = 18(1-i)\,. \tag{3}$$

After squaring this, we have that

$$x = 18^2(1-i)^2 = \pm 648\,i\,, \tag{4}$$

where both signs are required because of the symmetry between x and $-x$ in (1).