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But $\sqrt{-1}$ is not a number... Yet! The new number we invent, we will call $i = \sqrt{-1}$ With our new number, we can now solve the equation $x^2 + 1 = 0$ **Conclusion:** The solutions to $x^2 + 1 = 0$ are: $x = \pm i$

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How do we take square root of -4? Do we need another new number? We can re-write this in terms of i and not need another new number. Since |x| = 2i, we get that the solutions are: $x = \pm 2i = 2i, -2i$ Let's look at another example.

Example: Find the solutions to:

$$x^2 + 3 = 0$$

Subtracting 3 from each side, we get:

$$x^2 = x^2 + 3 - 3 = 0 - 3 = -3$$

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Since $|x| = \sqrt{3}i$, we get that the solutions are: $x = \pm \sqrt{3}i$

Example: Find the solutions to:

$$x^2 + 4 = 0$$

Subtracting 4 from each side, we get:

$$x^2 = x^2 + 4 = 0 - 4 = -4$$

The next step to solve $x^2 = -4$, we need to take the square root:

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