Dr Oliver Mathematics

Modulus Transformations

Core Mathematics 3, Chapter 5

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To Draw the Graph of $y = |f(x)|$

Chapter 5 of Core Mathematics 3 introduces two additional techniques for the graphs of related functions. The first of these is sketching the graph of $y = |f(x)|$ and there is a simple procedure for doing this.

1. Draw the graph of $y = f(x)$; we will draw the original graph in blue.
2. Identify any part of the graph which are below the x-axis; we will identify any such parts in red.
3. Reflect any such parts in the x-axis.
4. And that's it: you now have the graph of $y = |f(x)|$; the final graph will be given in green.

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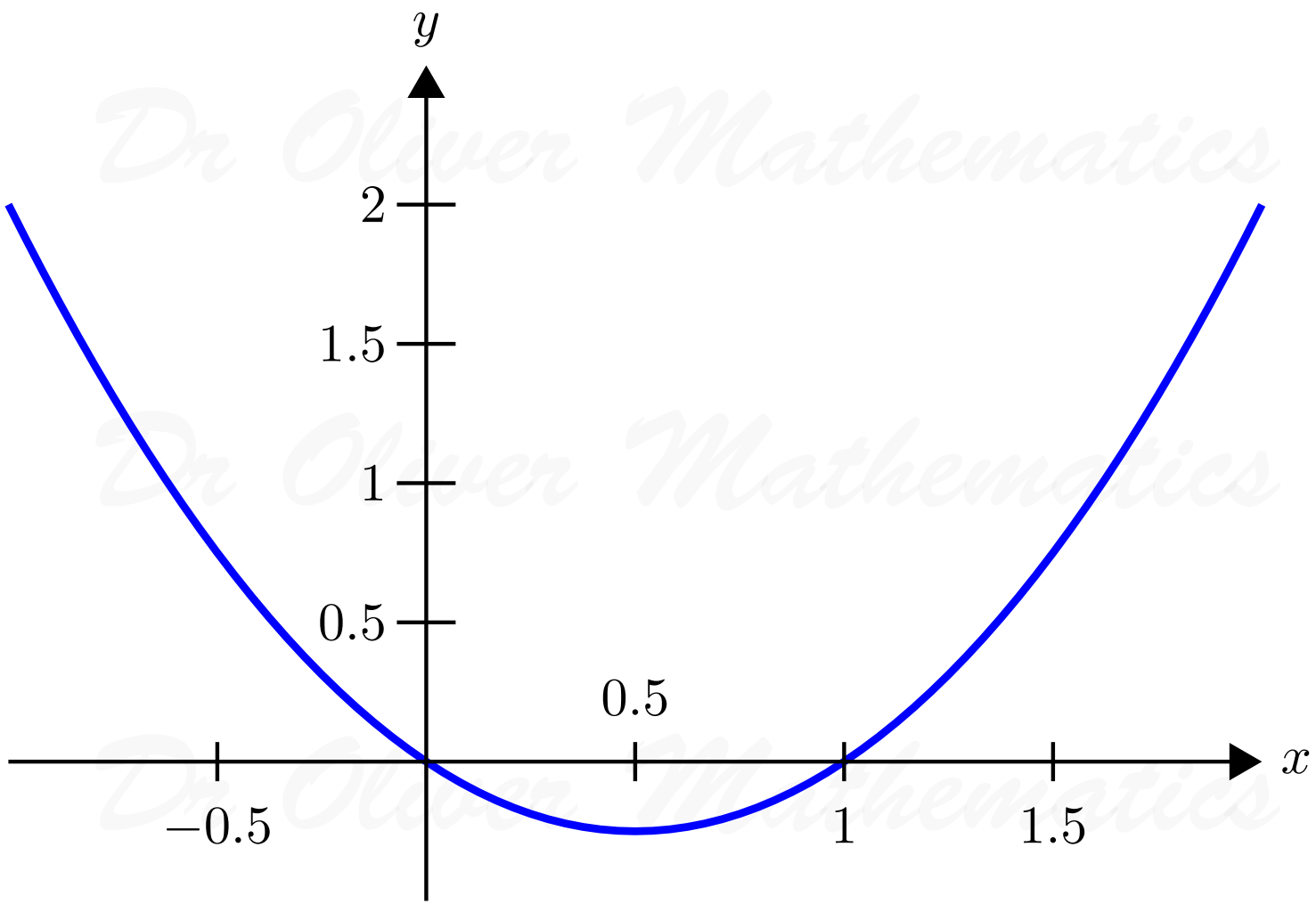
Example 1: Let $y = x(x-1)$. Draw $y = |f(x)|$.



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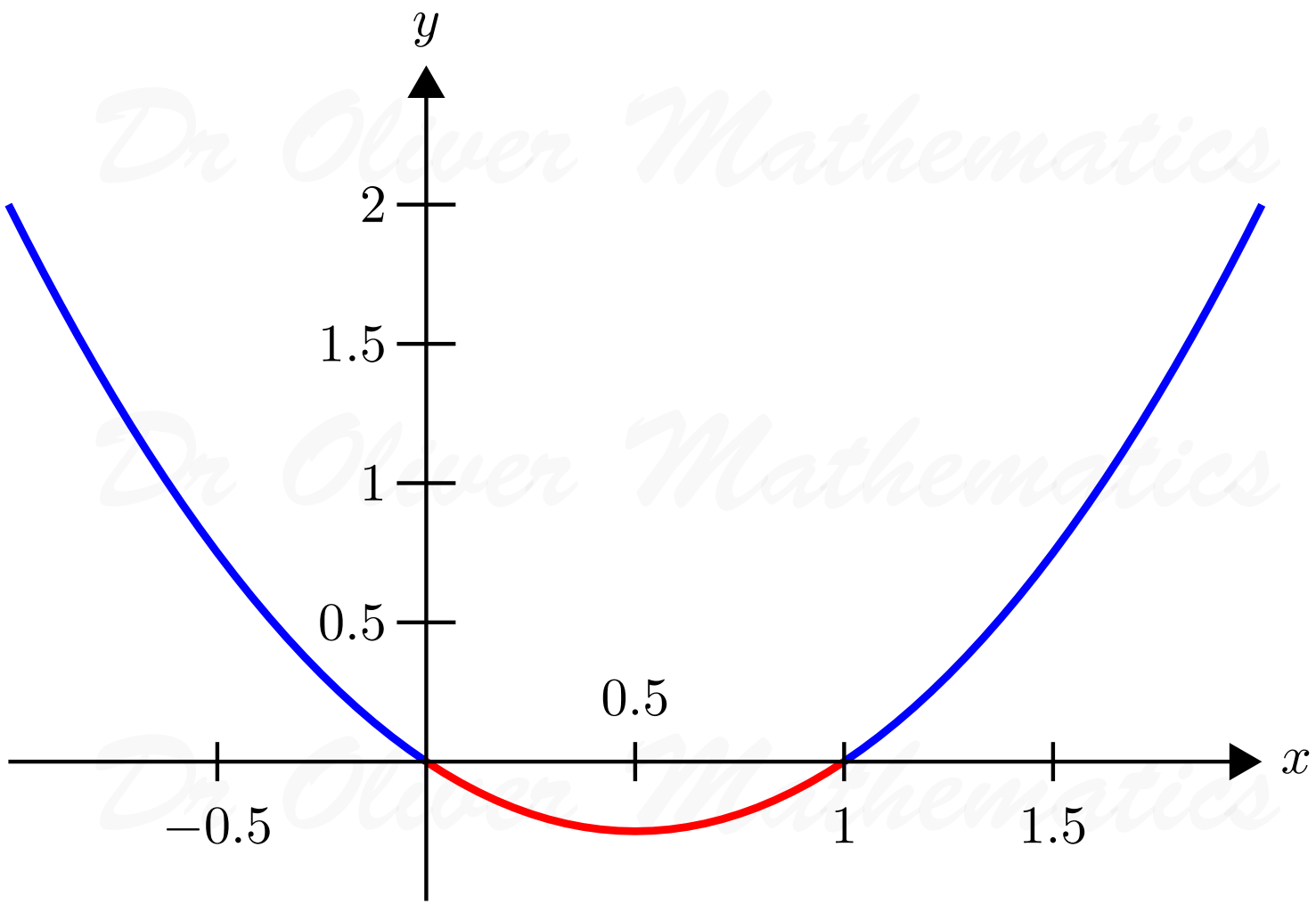

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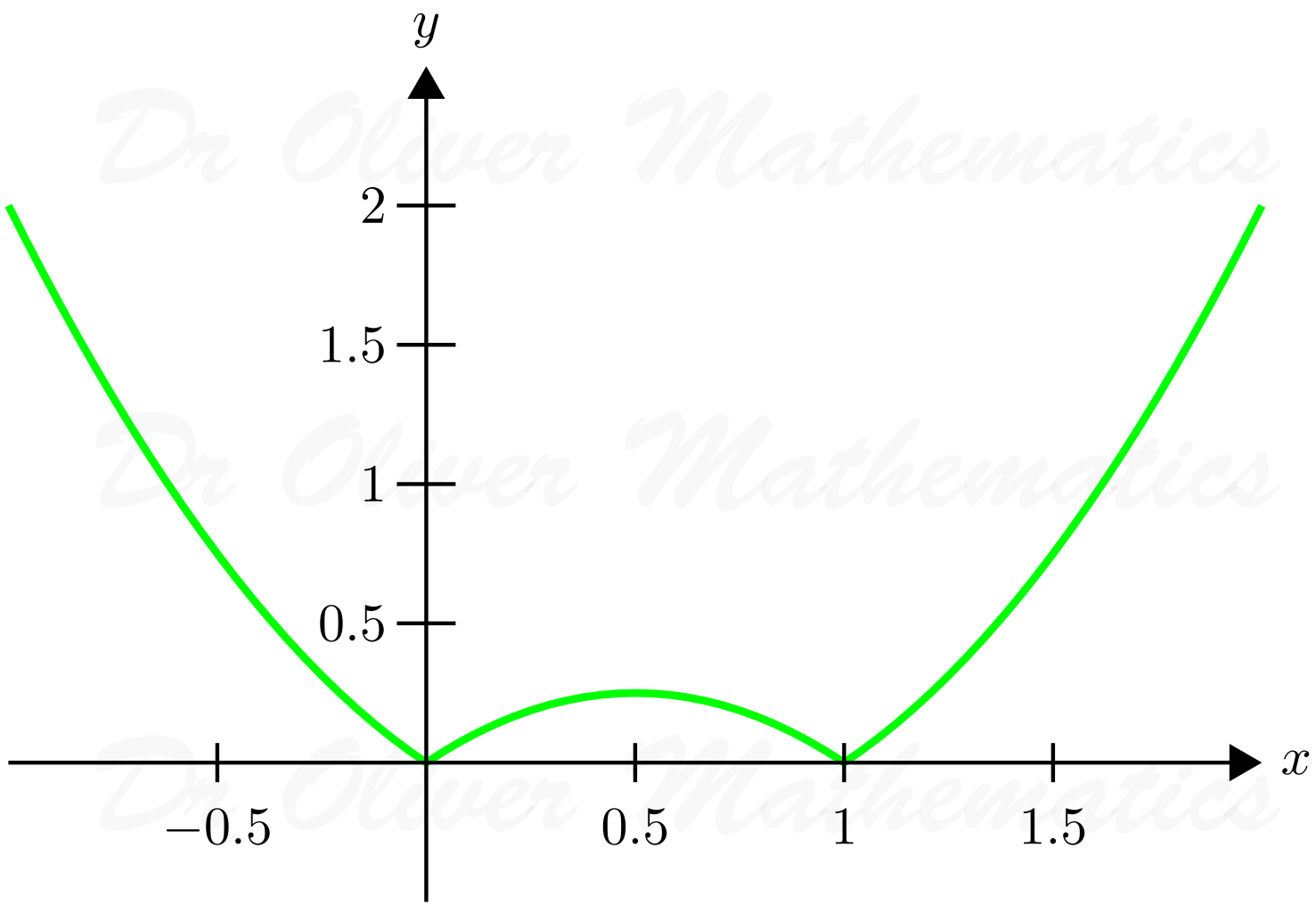

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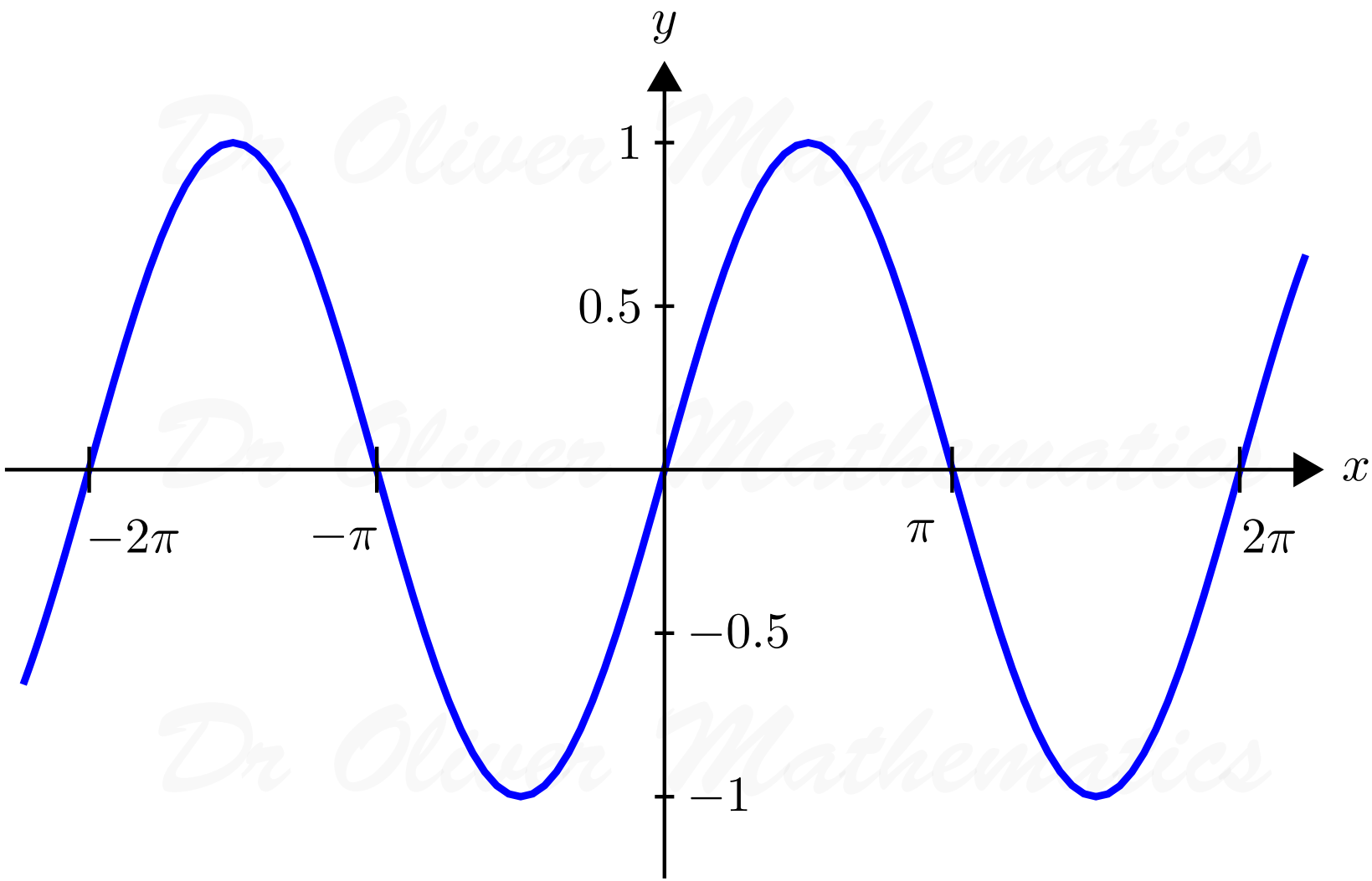
Example 2: Let $y = \sin x$. Draw $y = |f(x)|$.



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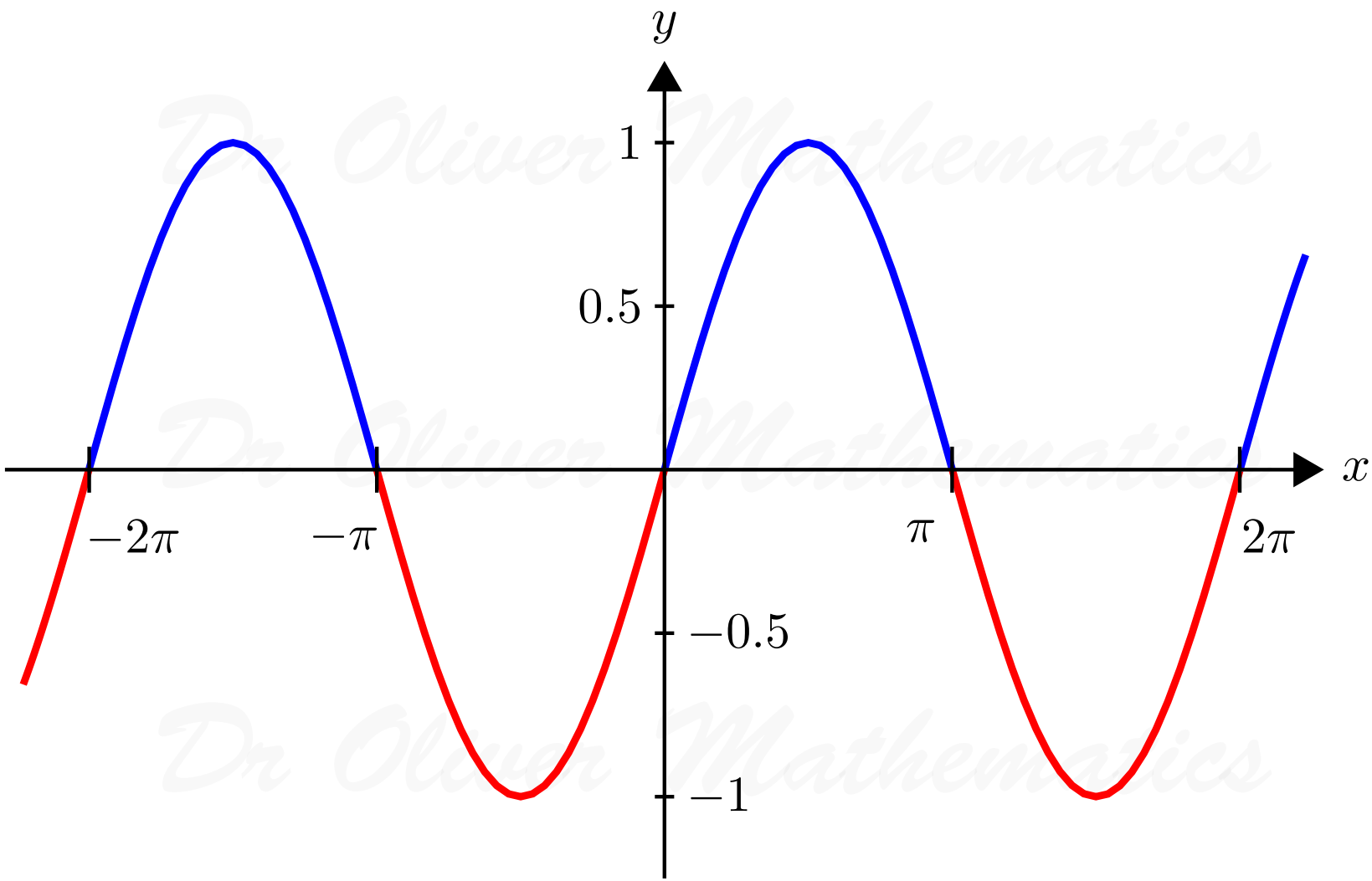

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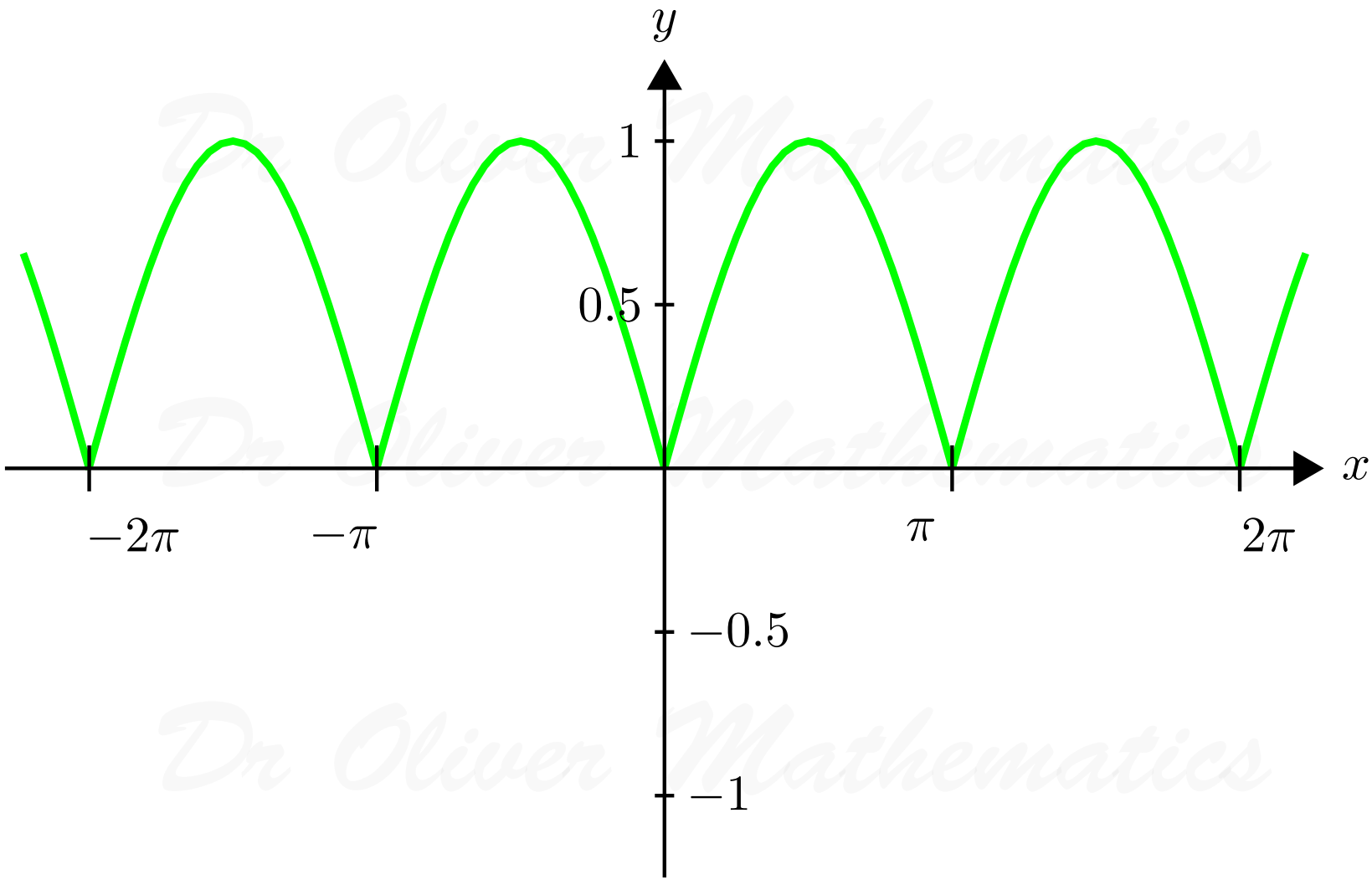

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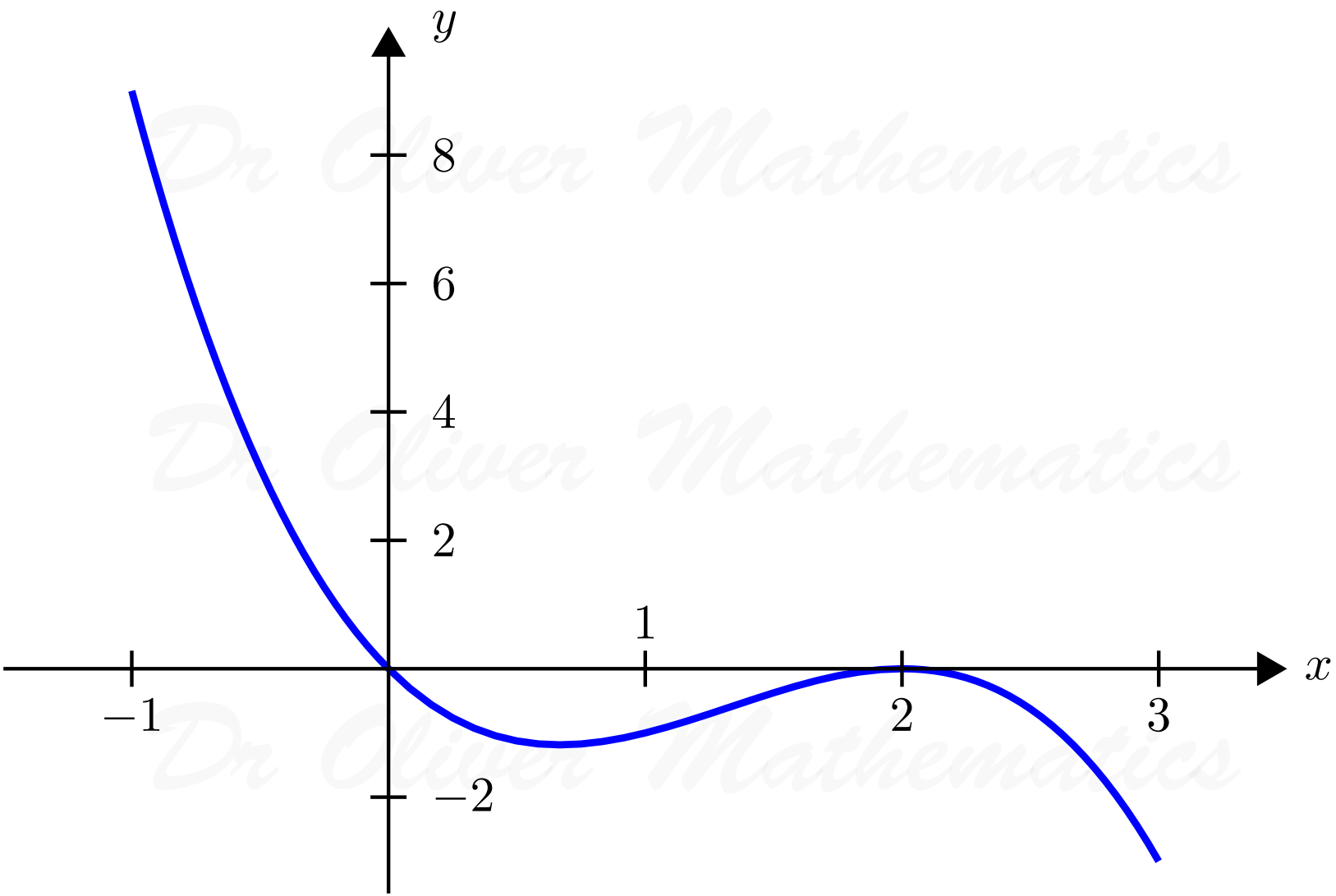
Example 3: Let $y = -x(2-x)^2$. Draw $y = |f(x)|$.



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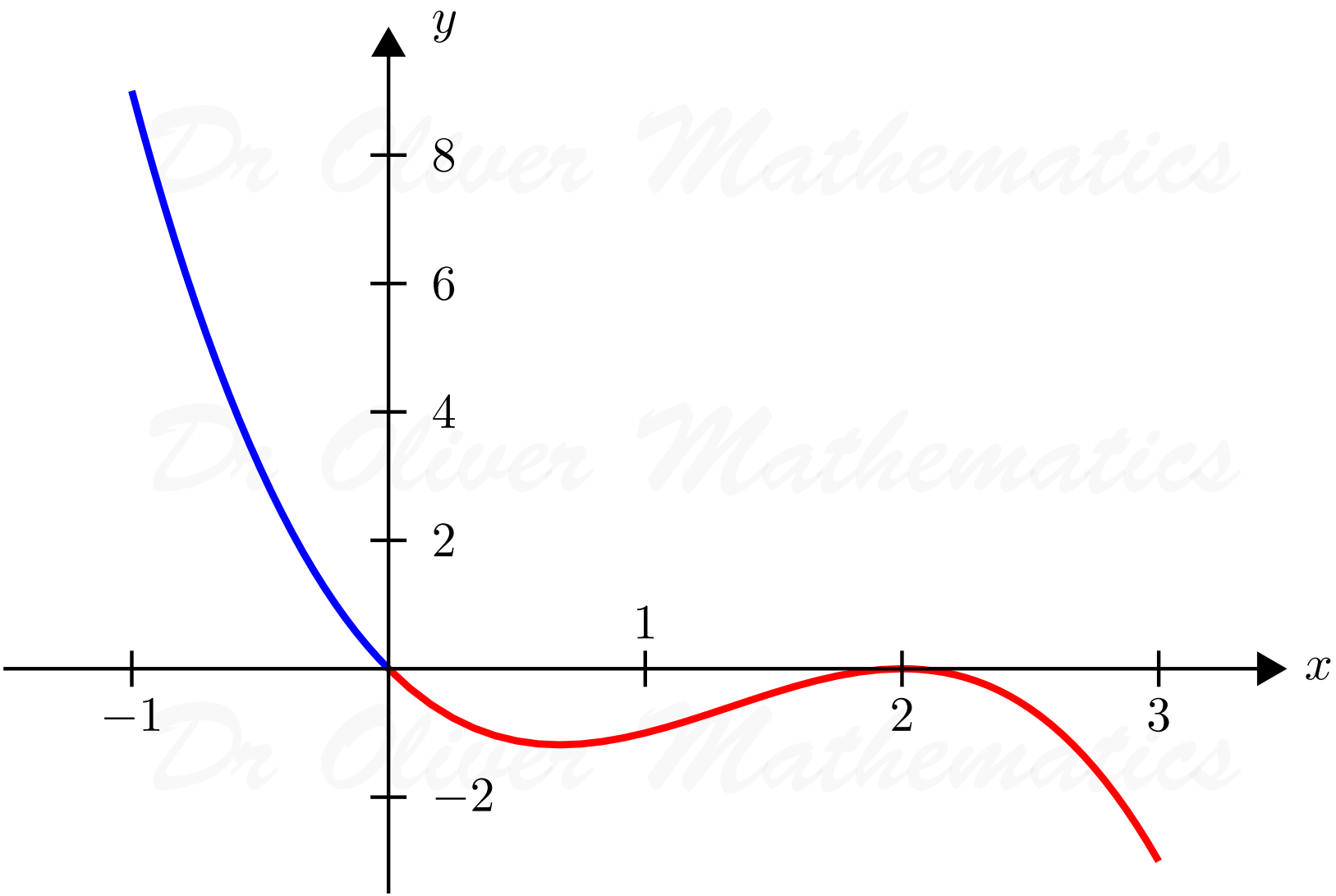

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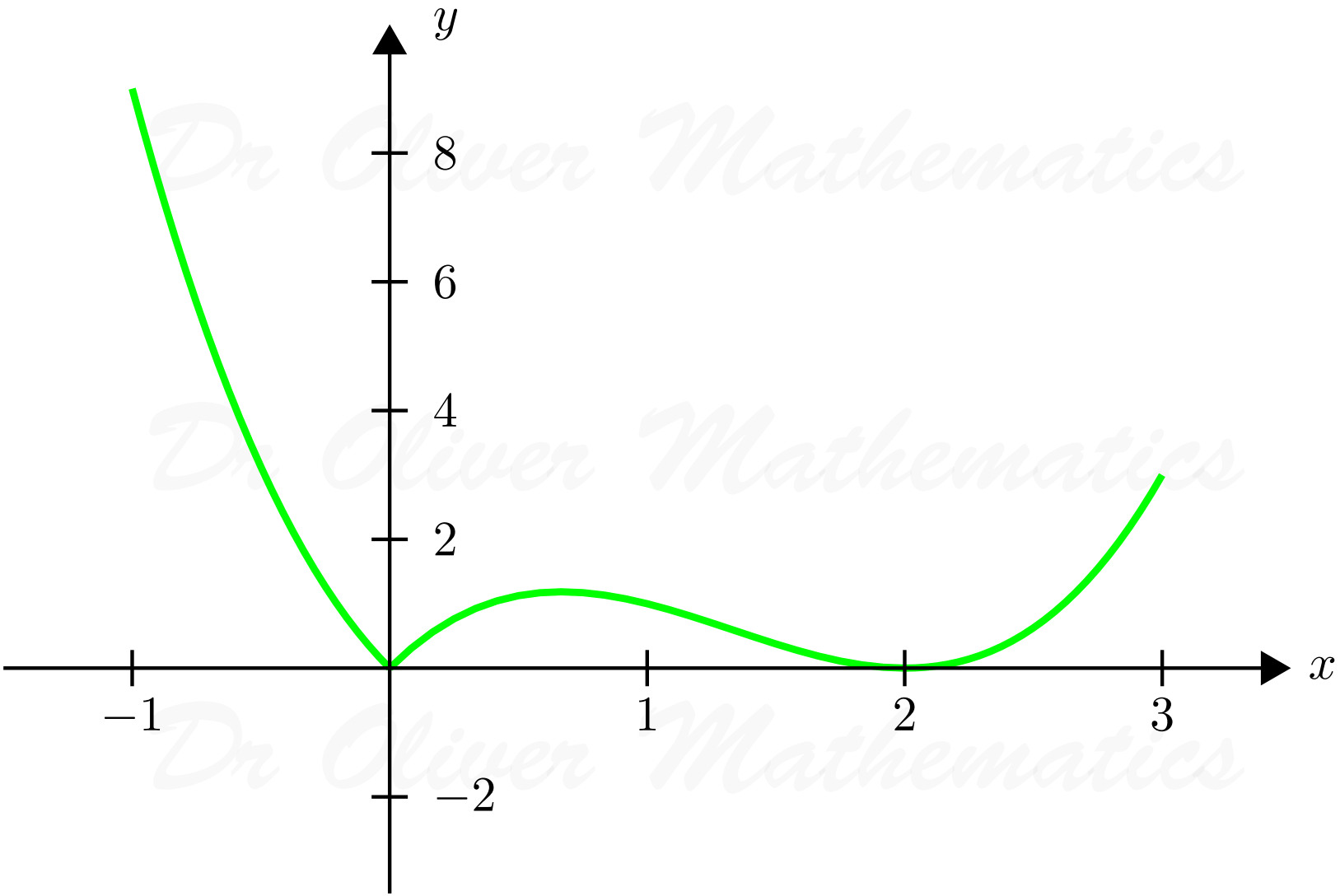

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To Draw the Graph of $y = f(|x|)$

The second technique is sketching the graph of $y = f(|x|)$ and the procedure is, if anything, even simpler.

1. Draw the graph of $y = f(x)$; we will draw the original graph in blue.
2. Discard any part of the graph that is to the left of the y-axis.
3. Reflect what is on the right of the y-axis in the y-axis.
4. And that's it: you now have the graph of $y = f(|x|)$; the final graph will be given in red.

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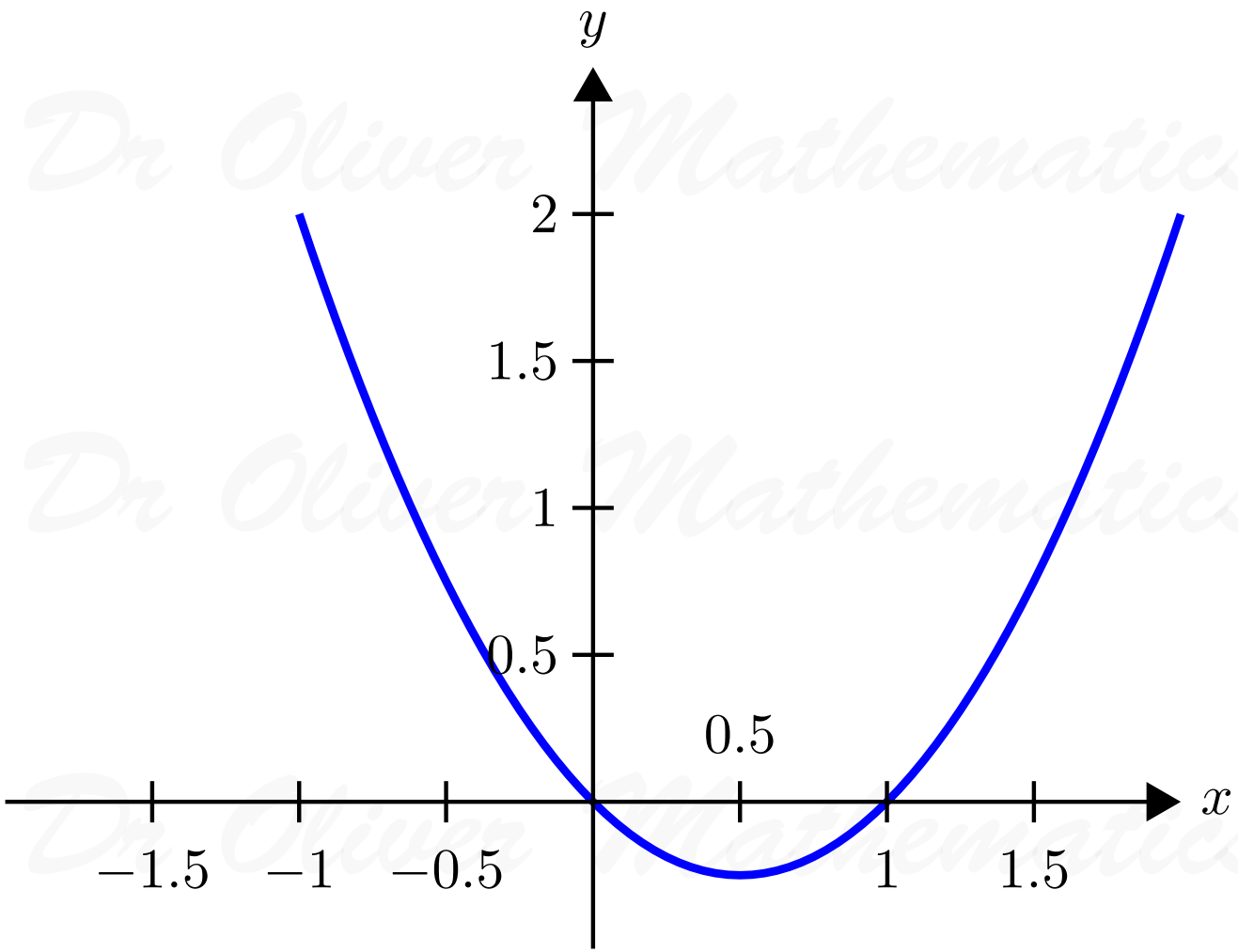
Example 4: Let $y = x(x-1)$. Draw $y = f(|x|)$.



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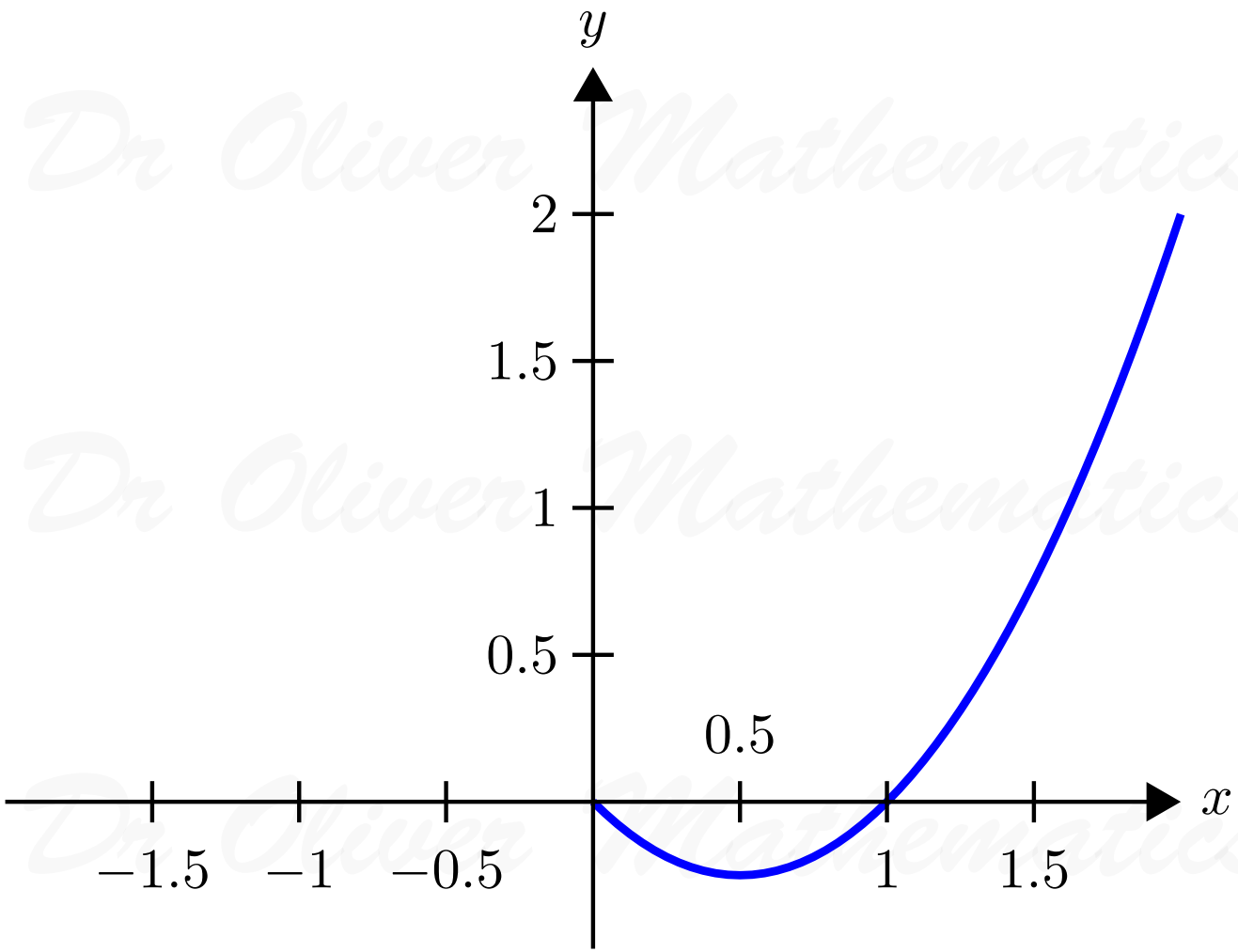

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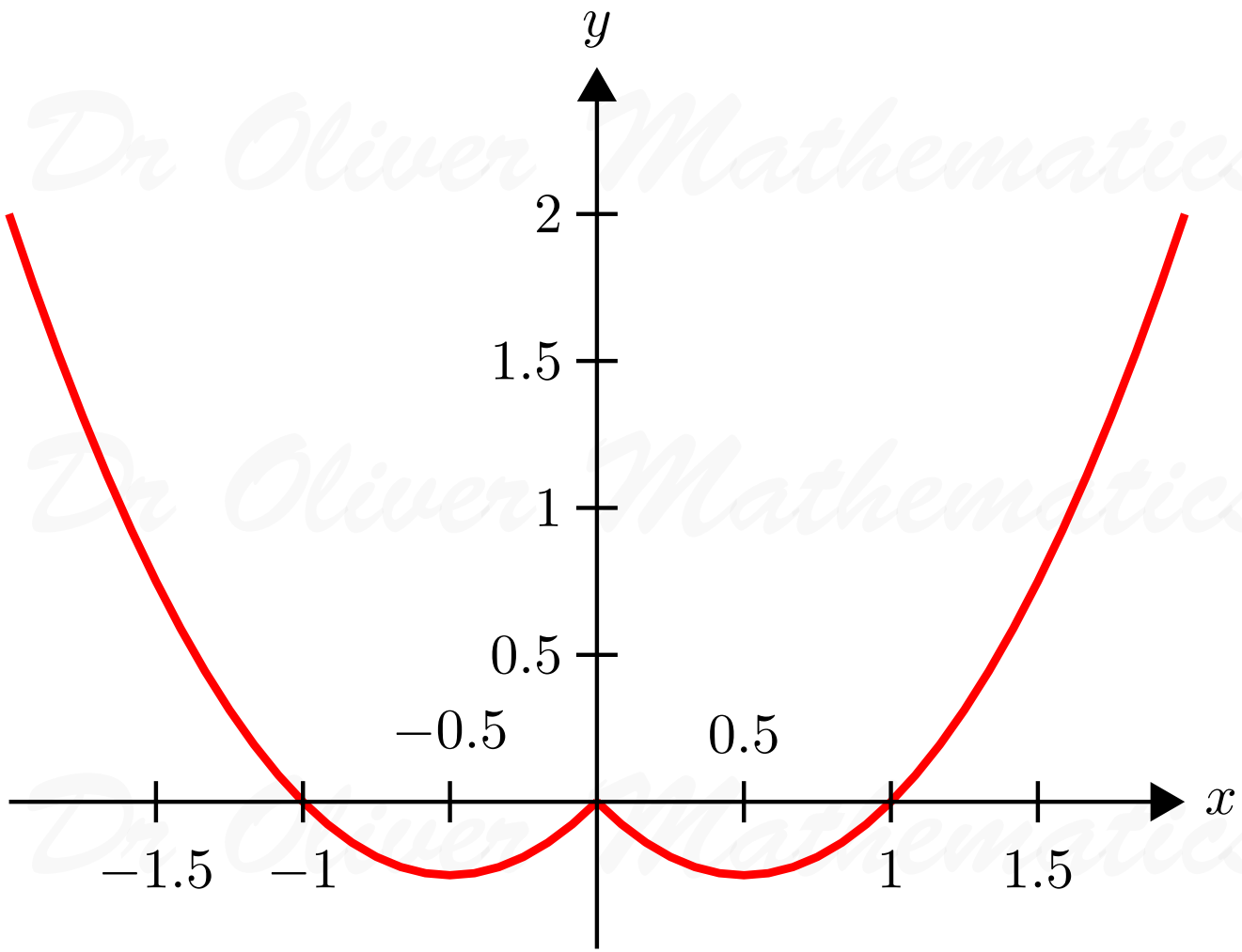

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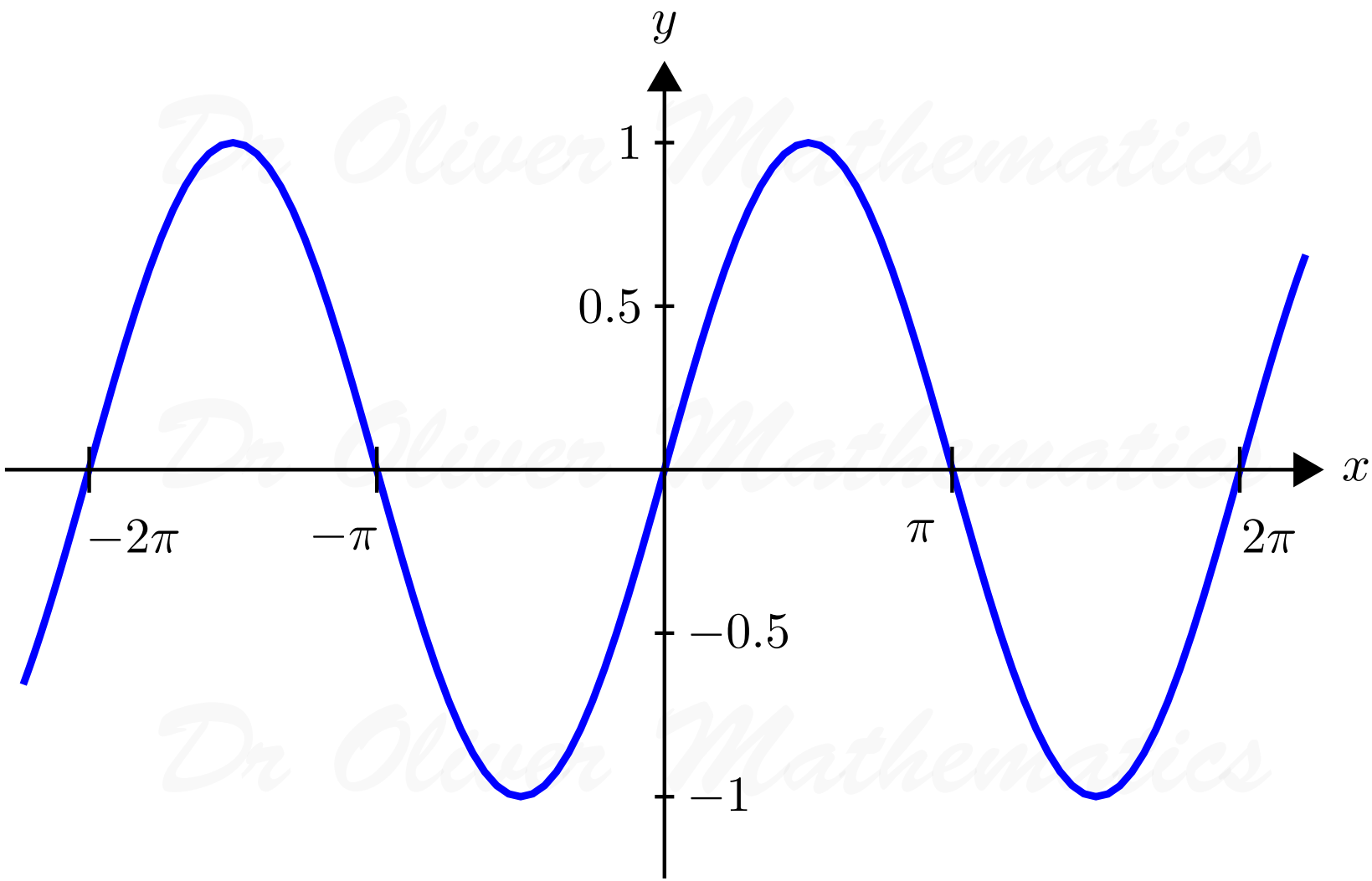
Example 5: Let $y = \sin x$. Draw $y = f(|x|)$.



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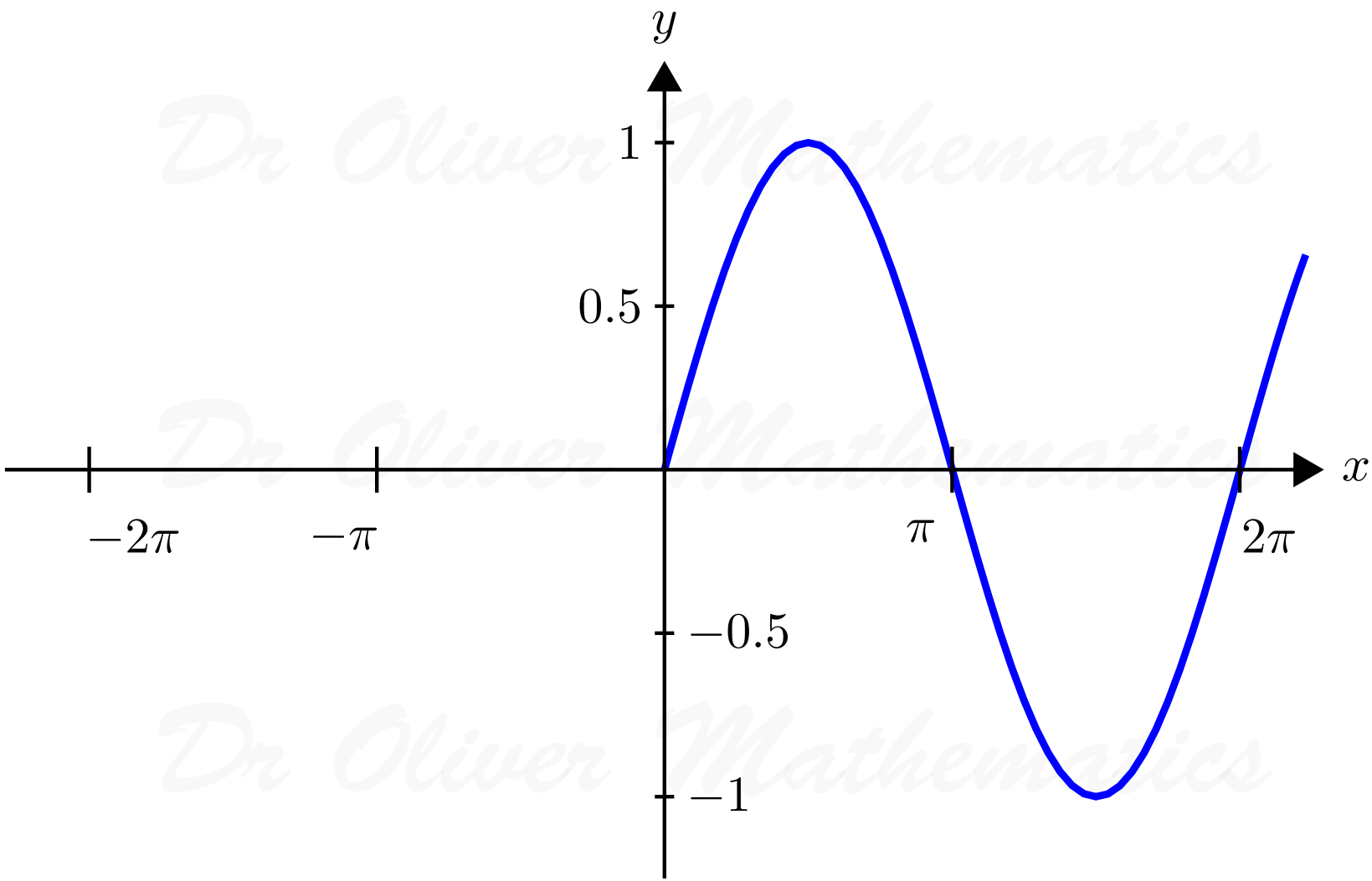

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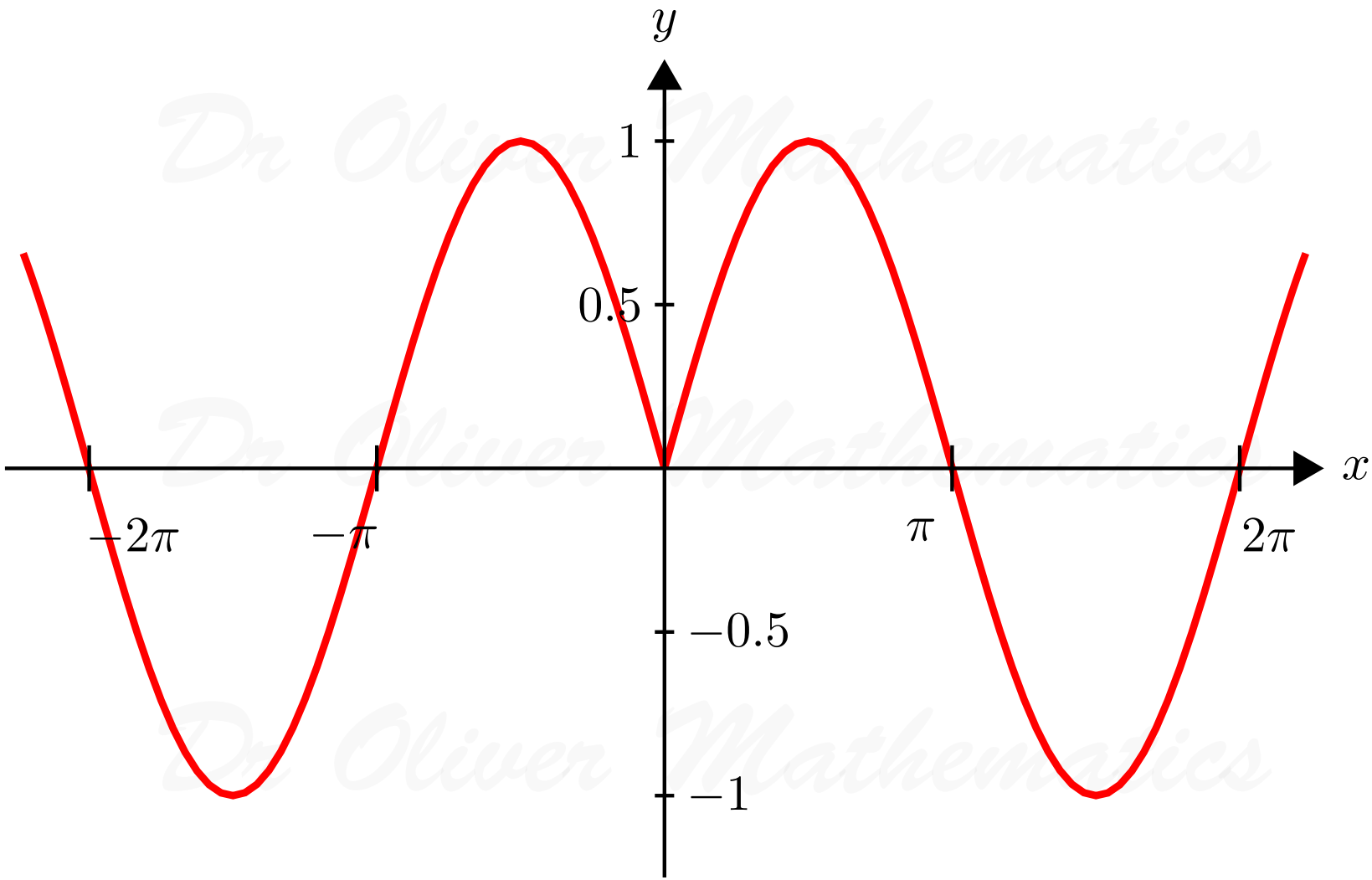

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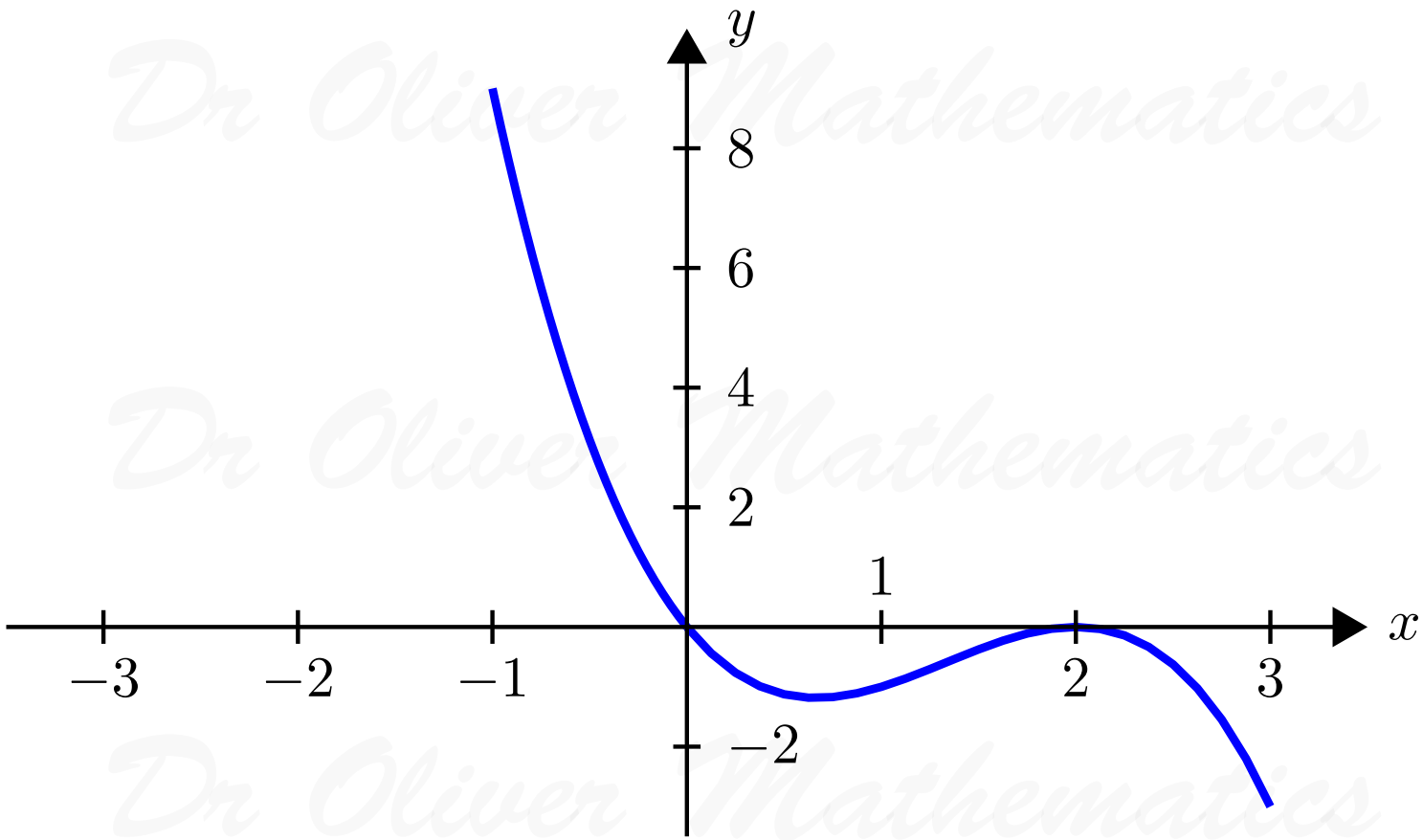
Example 6: Let $y = -x(2-x)^2$. Draw $y = f(|x|)$.



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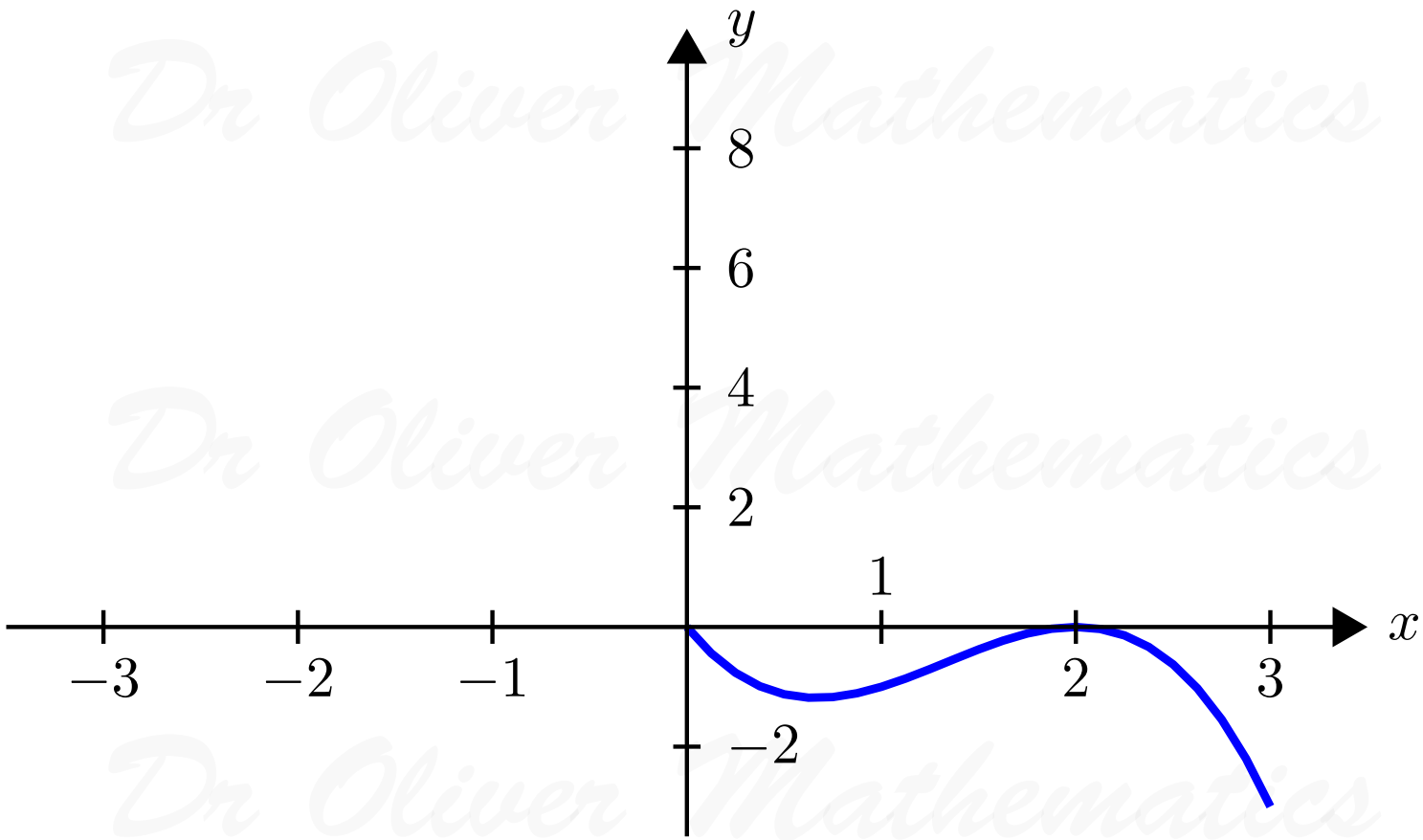

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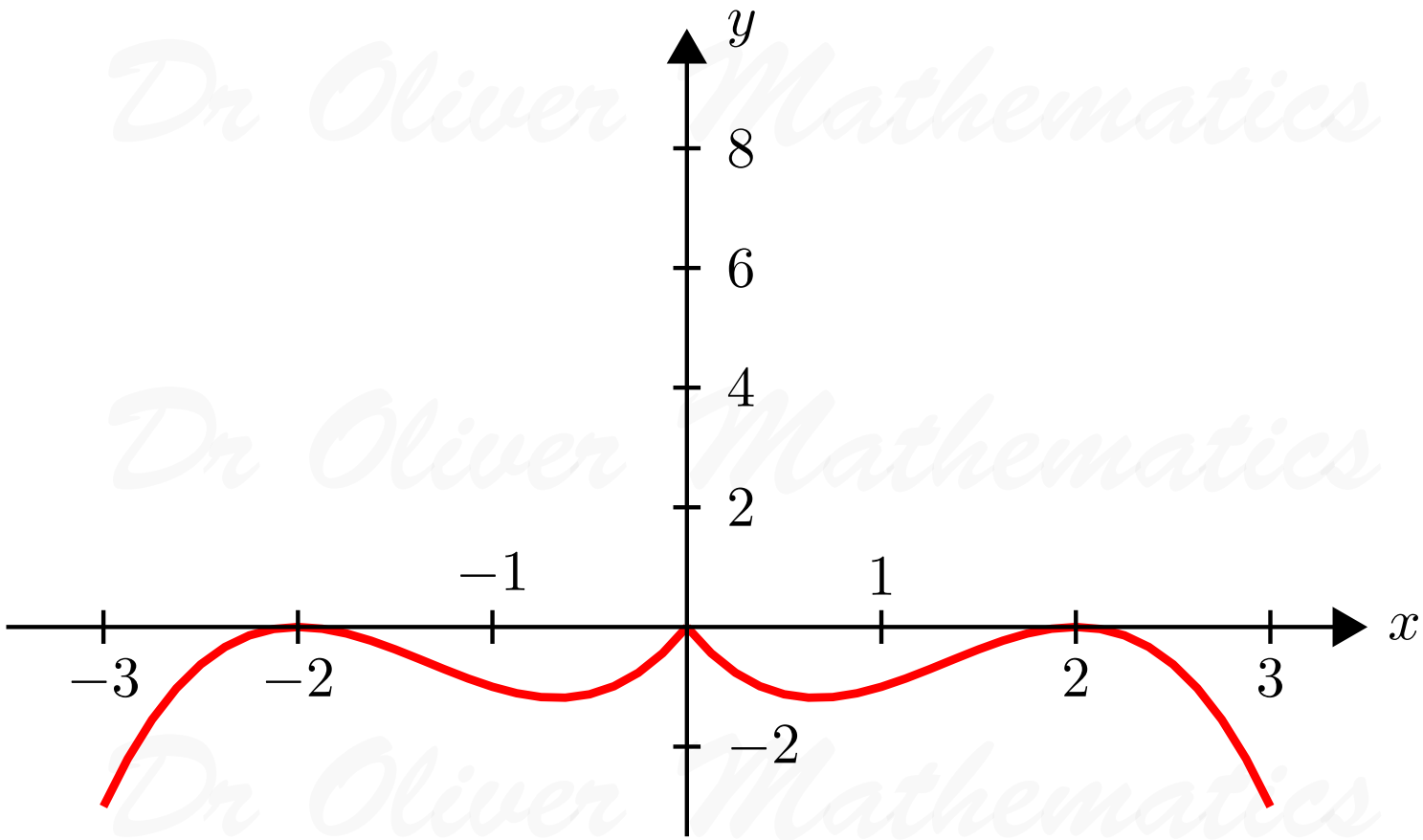

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