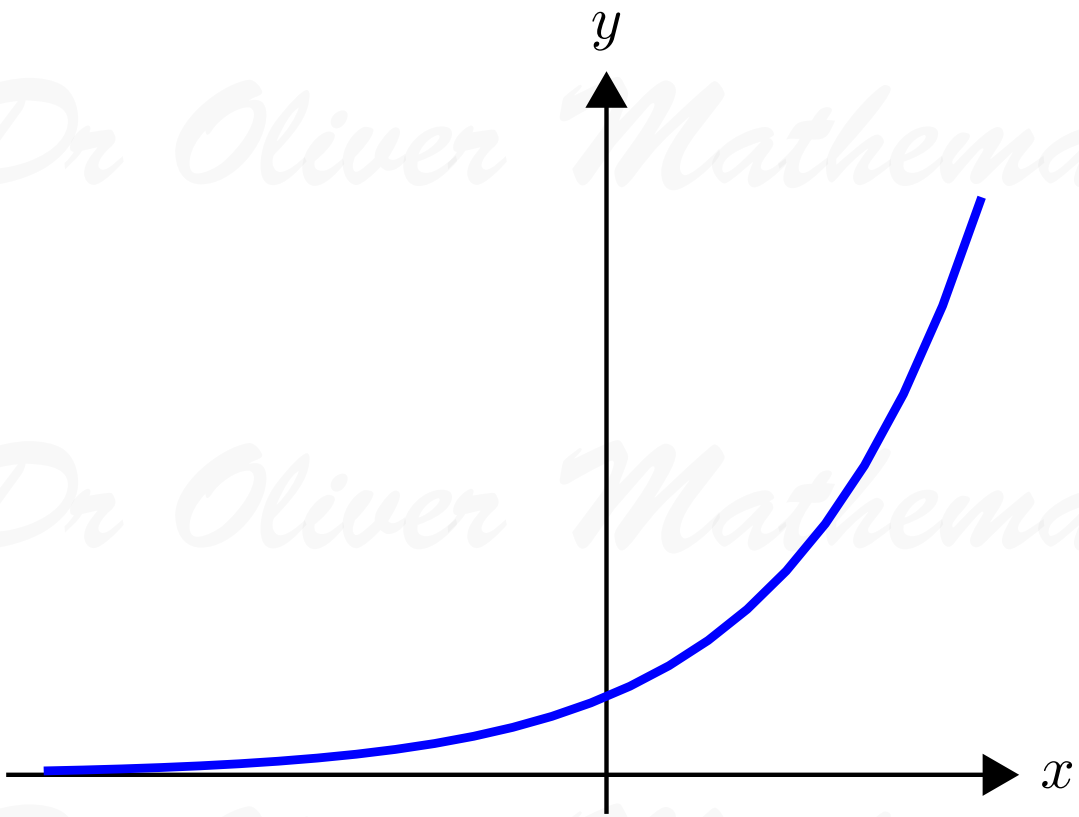
Dr Oliver Mathematics

Maclaurin Polynomials

Further Pure Mathematics 2, Chapter 6

1. $y = e^x$, $x \in \mathbb{R}$



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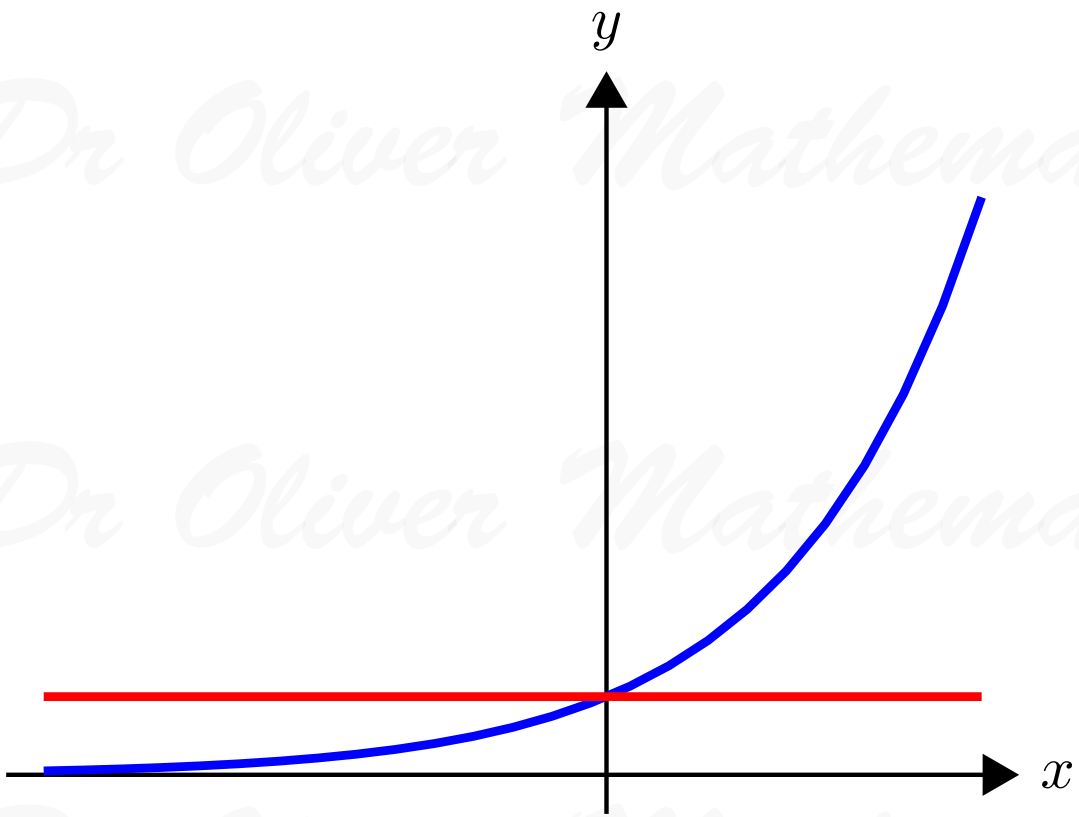
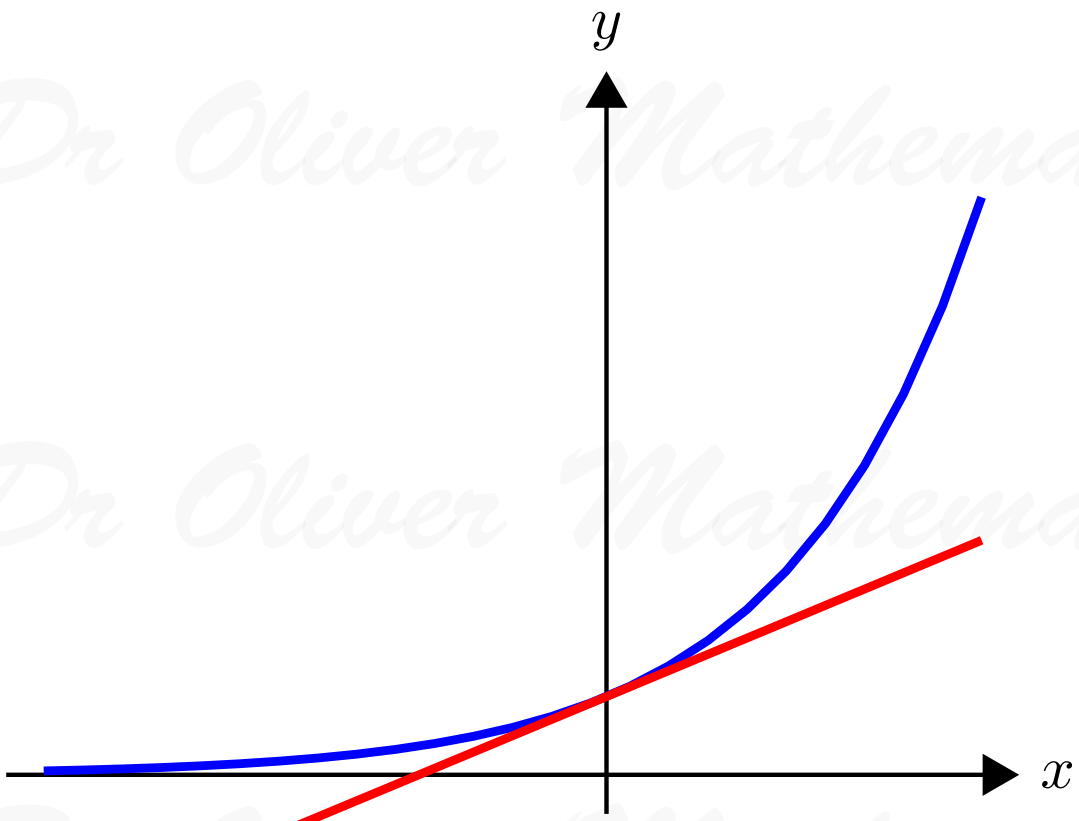


Approximating by $f(x) = 1$

1. $y = e^x$, $x \in \mathbb{R}$



Approximating by $f(x) = 1 + x$

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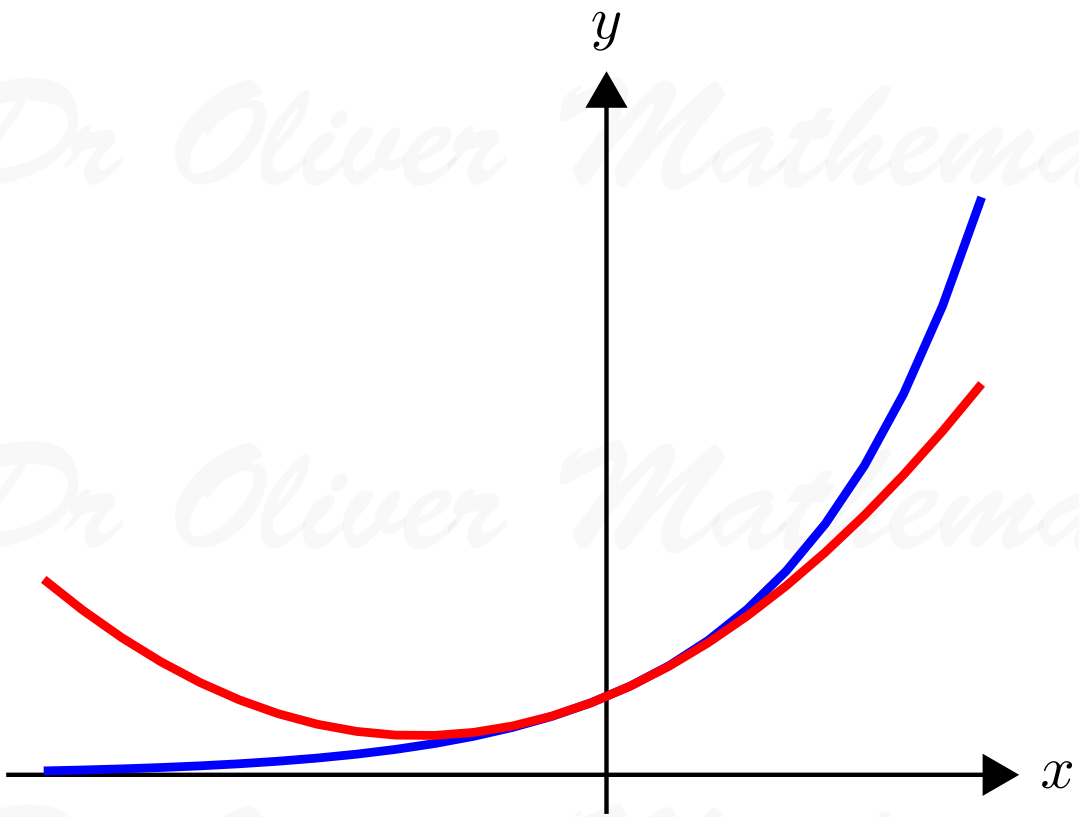
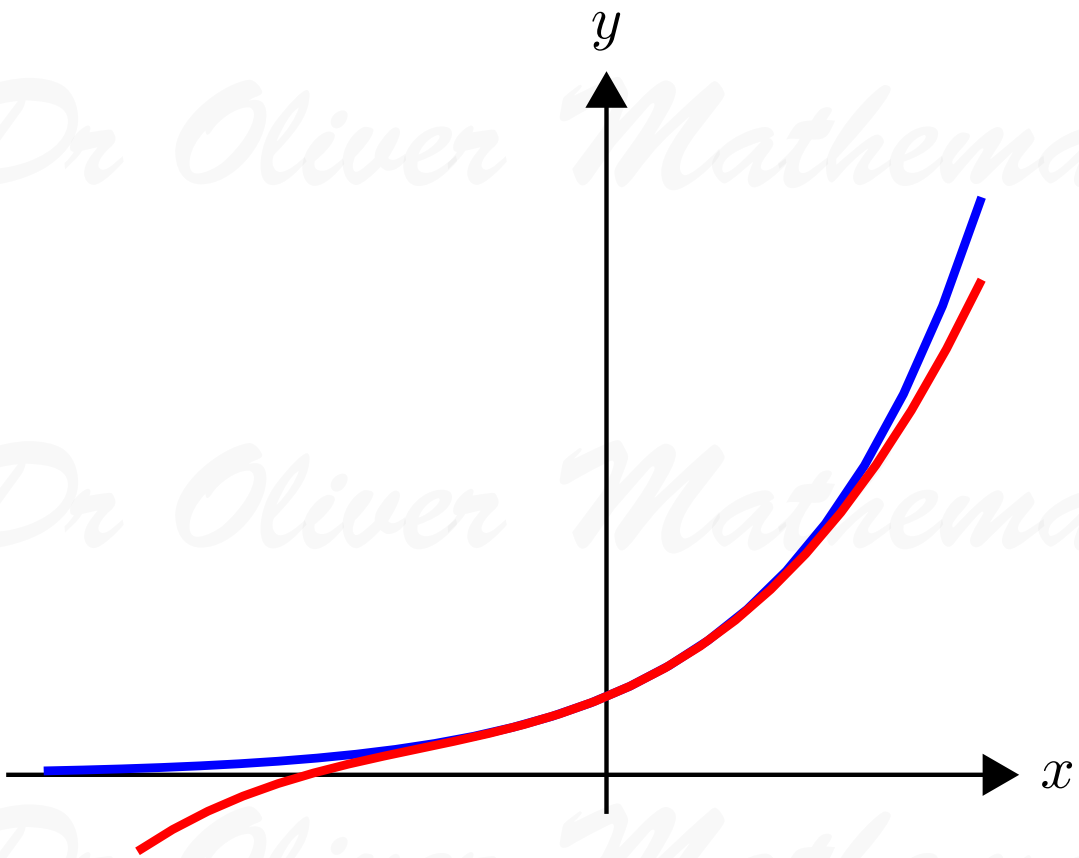


Approximating by $f(x) = 1 + x + \frac{1}{2!}x^2$

1. $y = e^x$, $x \in \mathbb{R}$



Approximating by $f(x) = 1 + x + \frac{1}{2!}x^2 + \frac{1}{3!}x^3$

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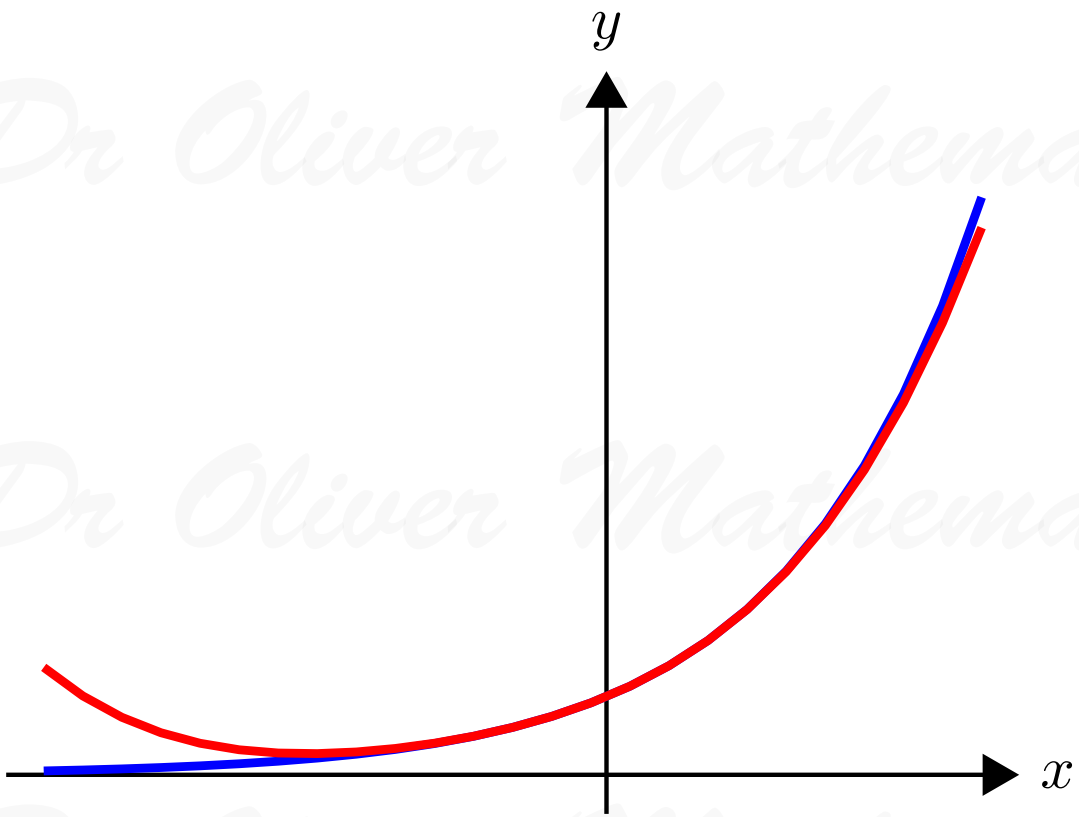

Approximating by $f(x) = 1 + x + \frac{1}{2!}x^2 + \frac{1}{3!}x^3 + \frac{1}{4!}x^4$

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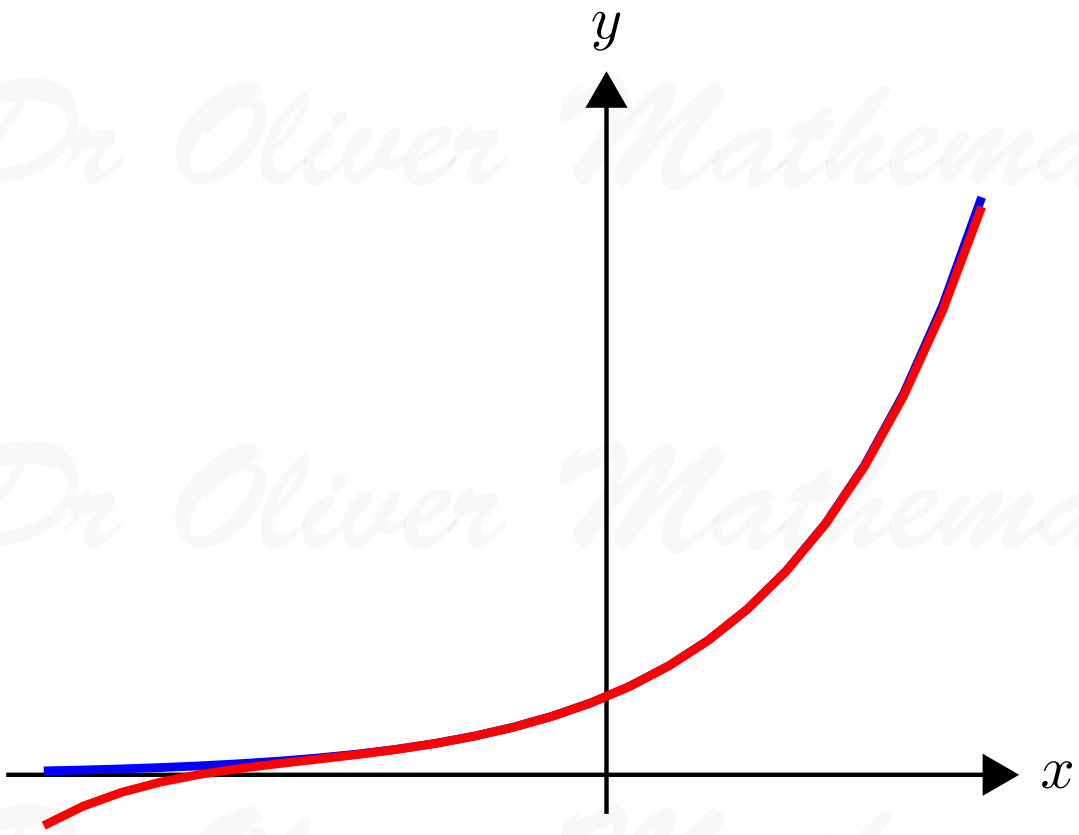

Approximating by $f(x) = 1 + x + \frac{1}{2!}x^2 + \frac{1}{3!}x^3 + \frac{1}{4!}x^4 + \frac{1}{5!}x^5$

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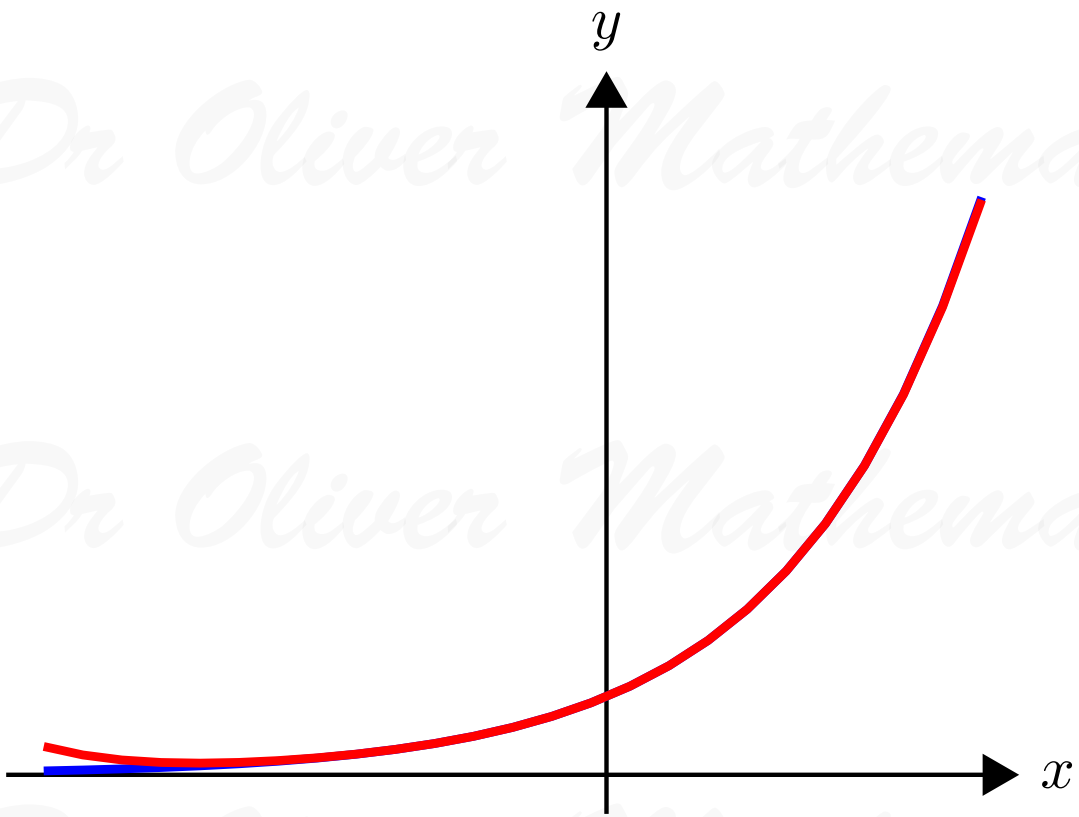
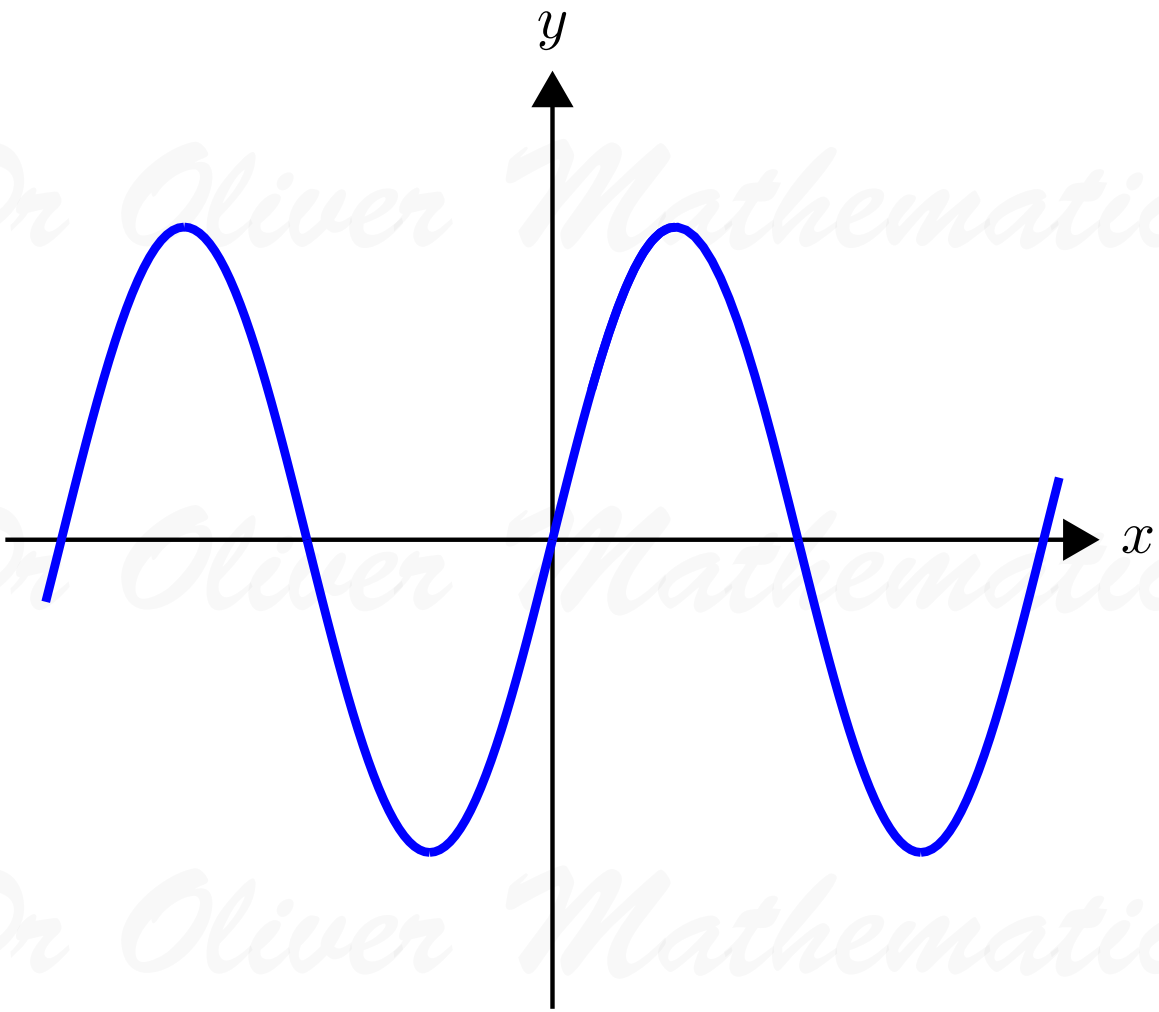


Approx by $f(x) = 1 + x + \frac{1}{2!}x^2 + \frac{1}{3!}x^3 + \frac{1}{4!}x^4 + \frac{1}{5!}x^5 + \frac{1}{6!}x^6$

2. $y = \sin x,\ x \in \mathbb{R}$



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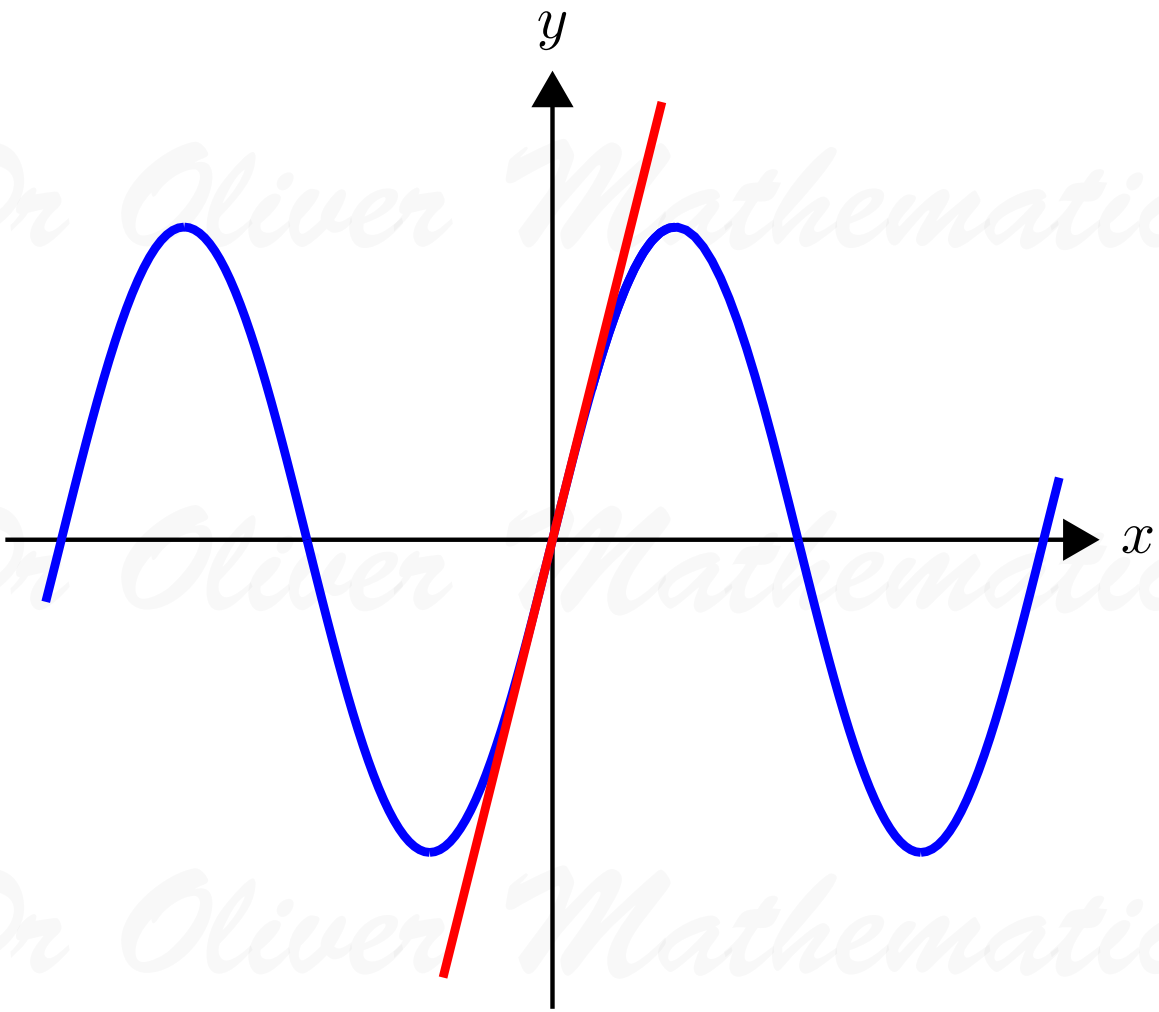

Approximating by $f(x) = x$

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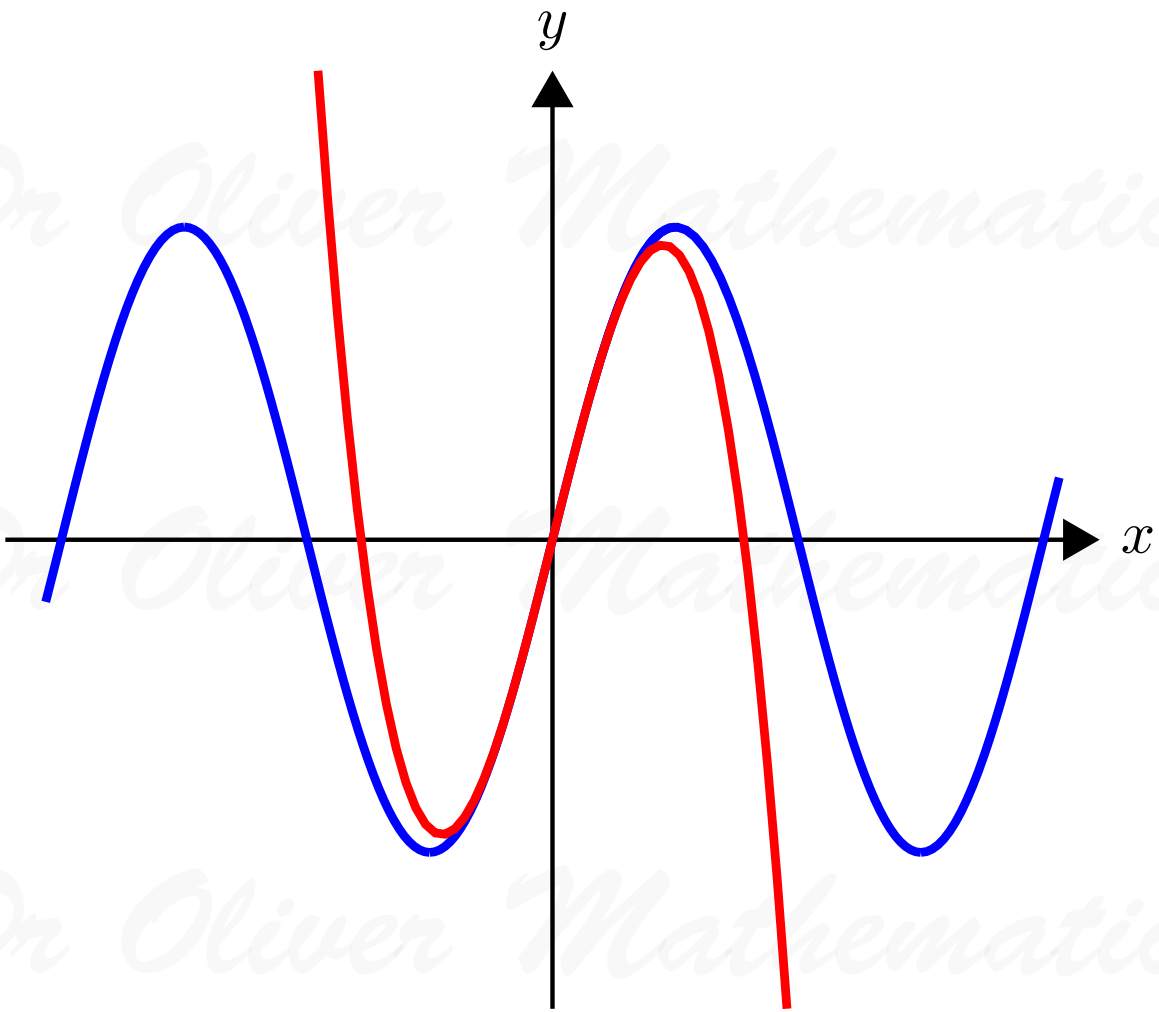
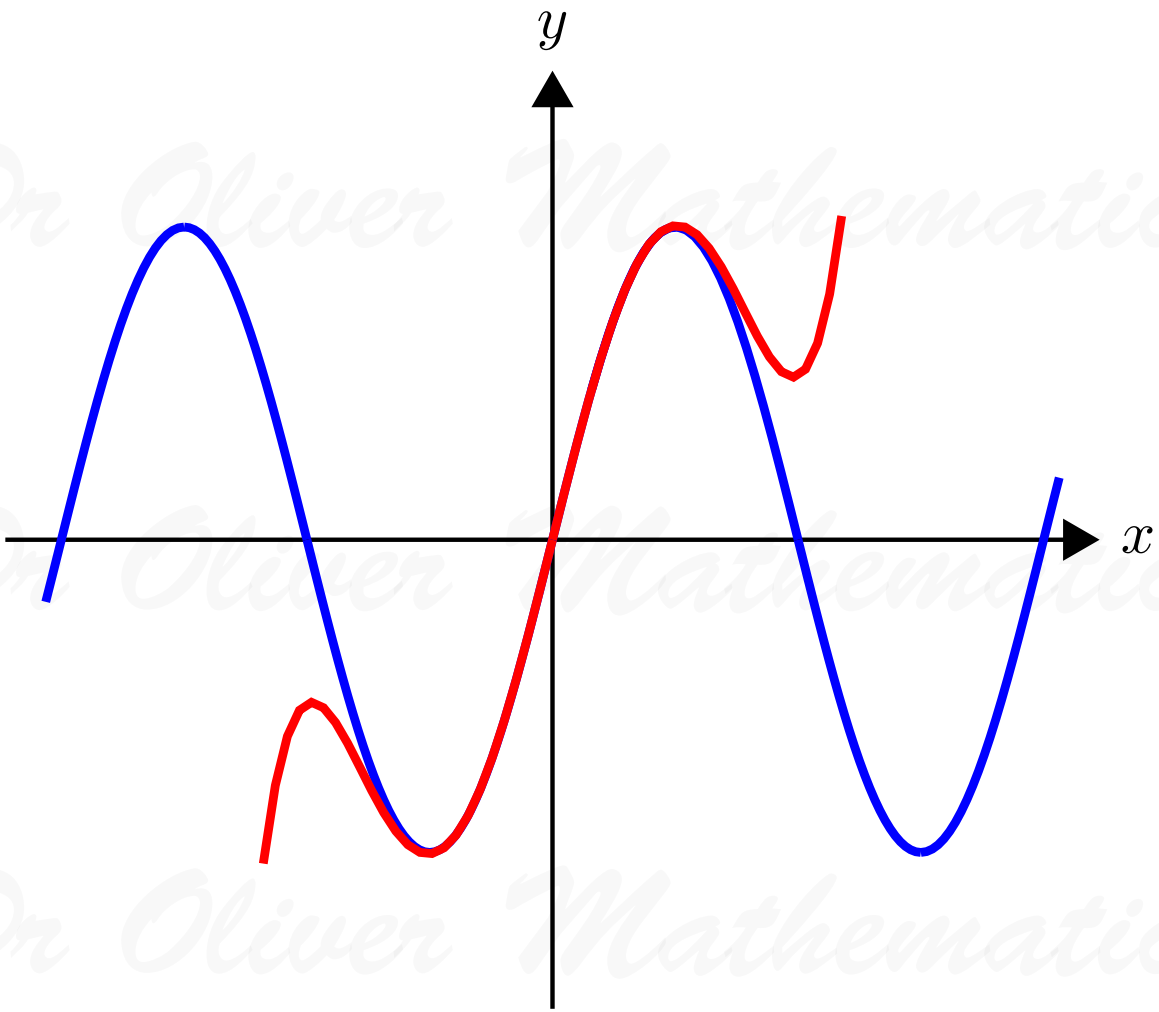


Approximating by $f(x) = x - \frac{1}{3!}x^3$

2. $y = \sin x,\ x \in \mathbb{R}$



Approximating by $f(x) = x - \frac{1}{3!}x^3 + \frac{1}{5!}x^5$

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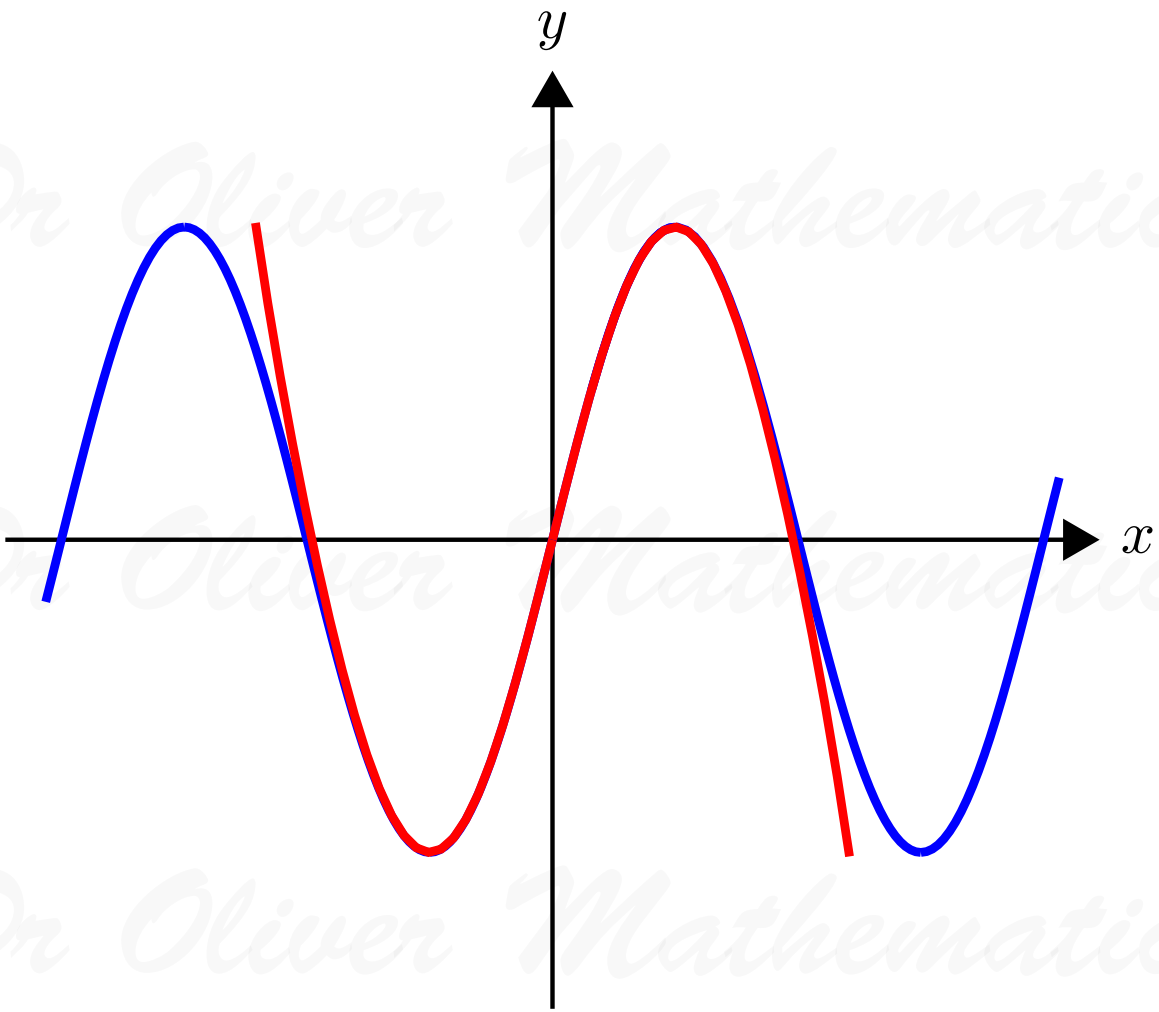
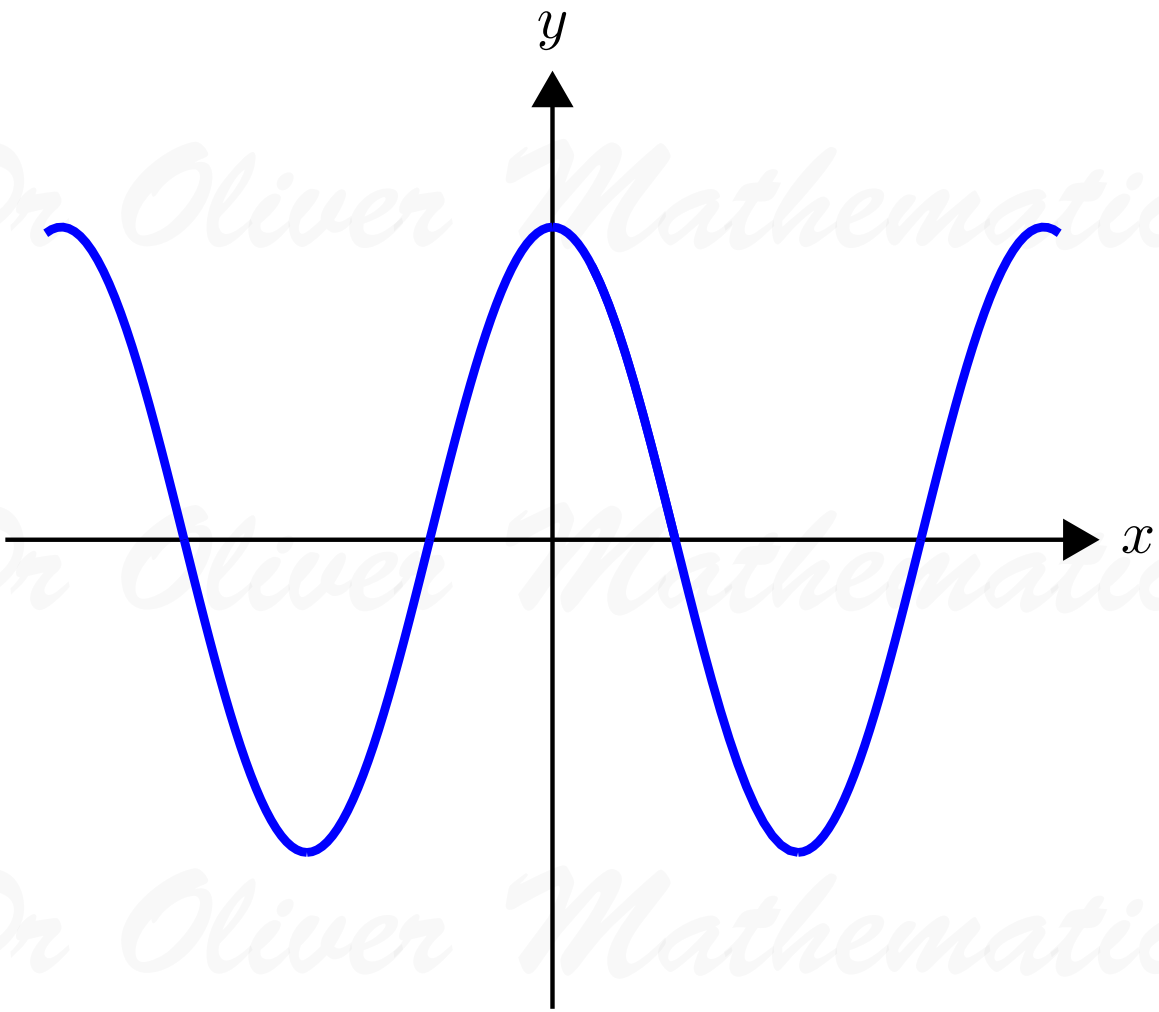


Approximating by $f(x) = x - \frac{1}{3!}x^3 + \frac{1}{5!}x^5 - \frac{1}{7!}x^7$

3. $y = \cos x,\ x \in \mathbb{R}$



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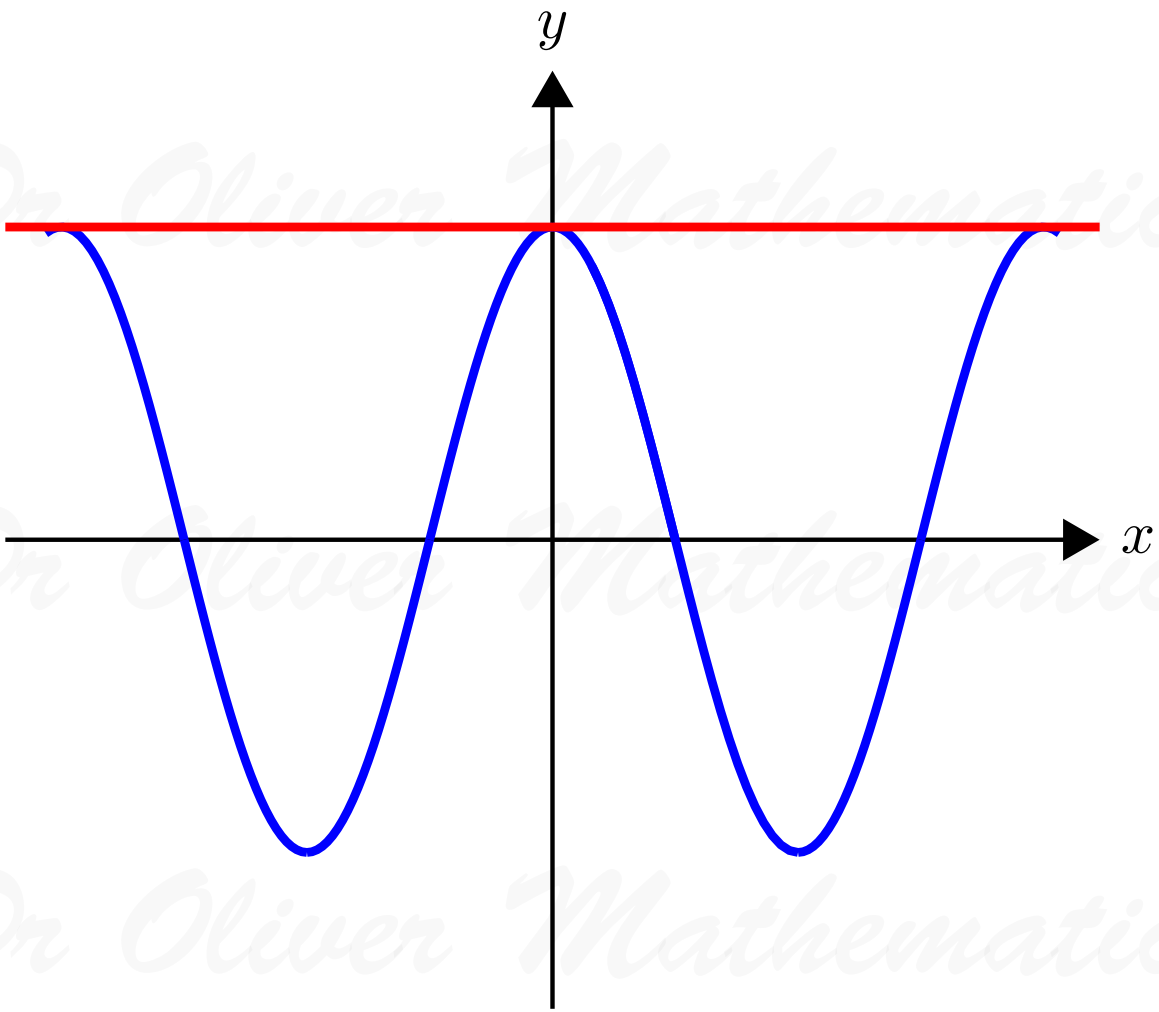
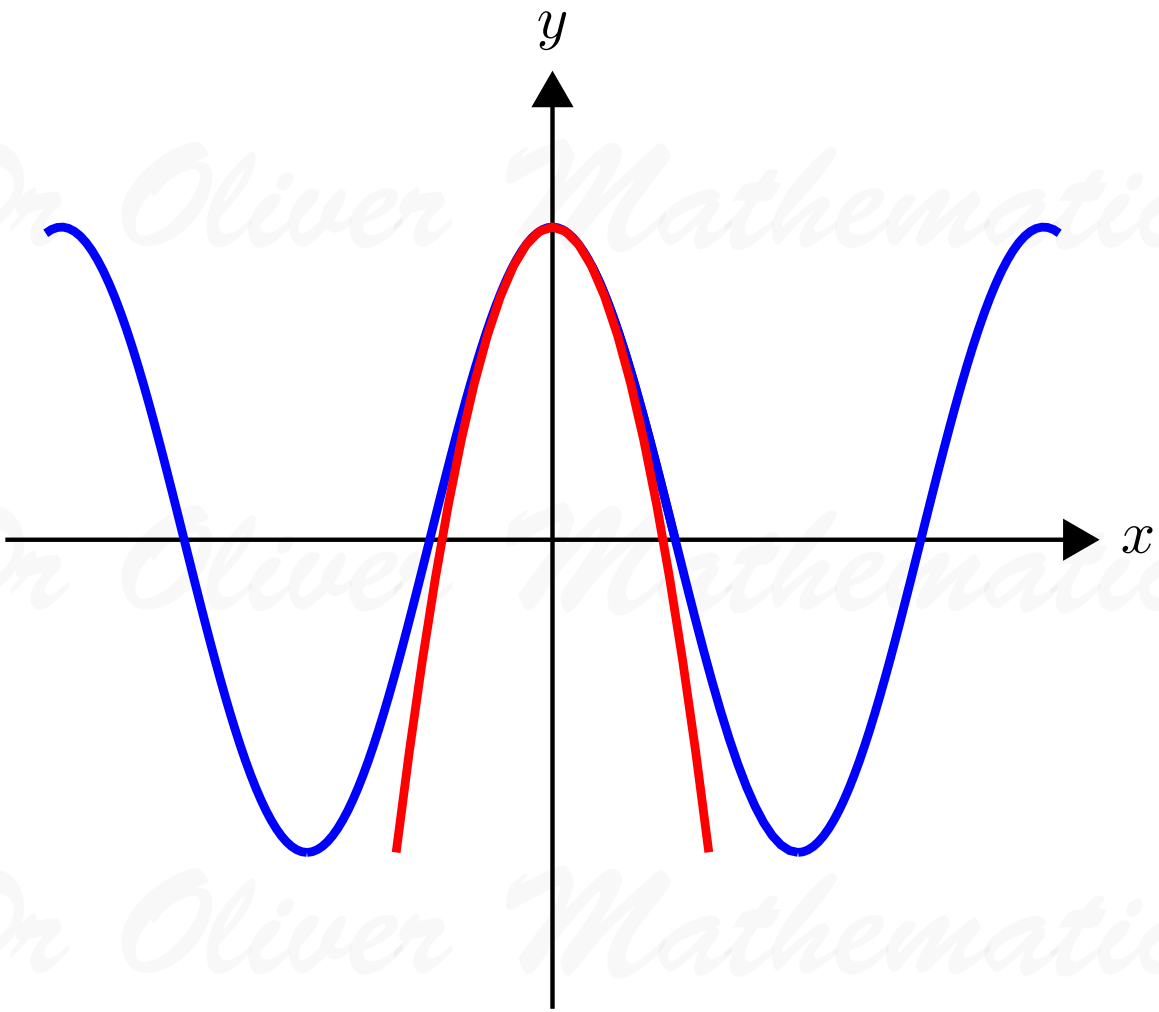


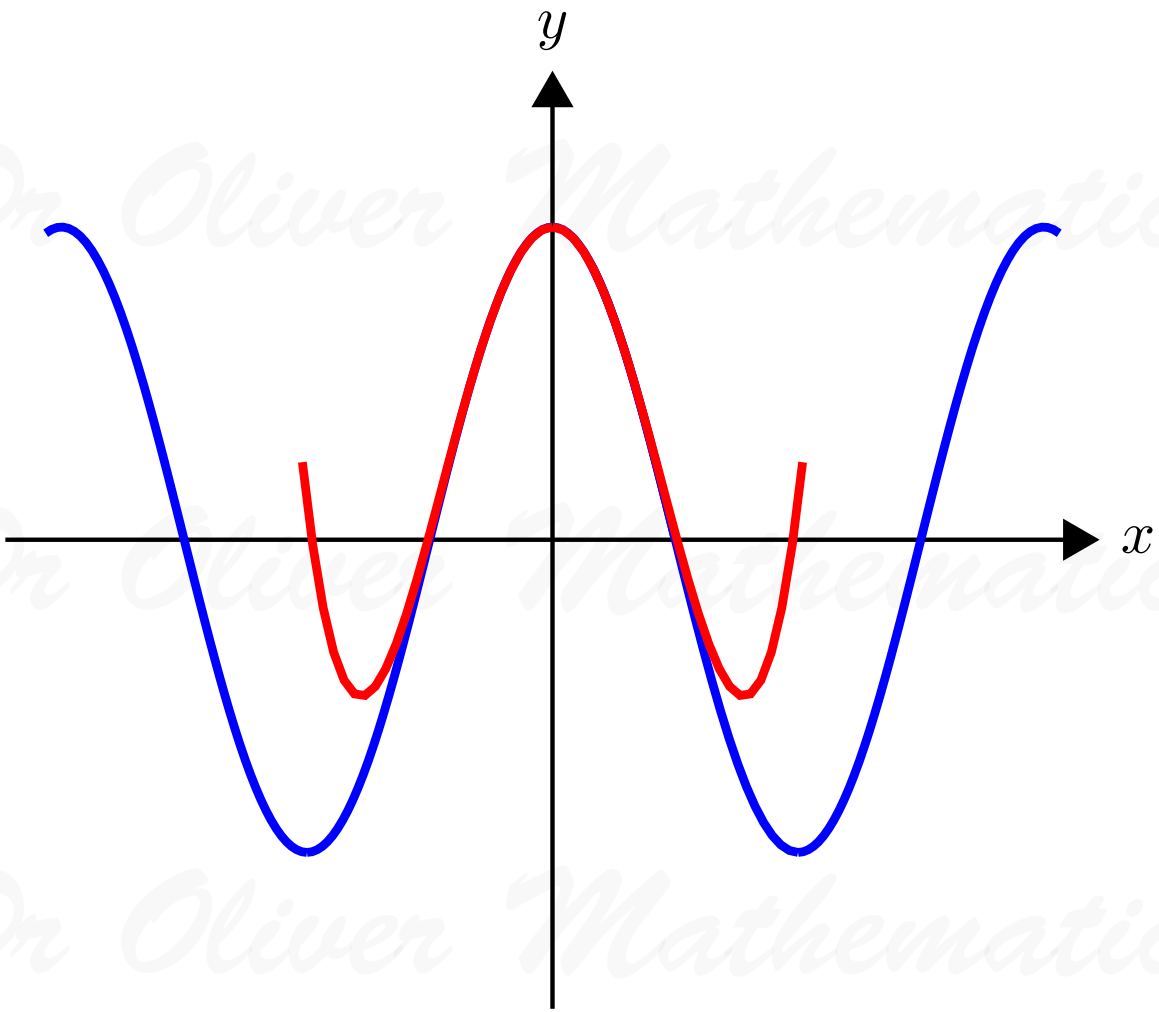
Approximating by $f(x) = 1$

3. $y = \cos x,\ x \in \mathbb{R}$



Approximating by $f(x) = 1 - \frac{1}{2!}x^2$

3. $y = \cos x,\ x \in \mathbb{R}$



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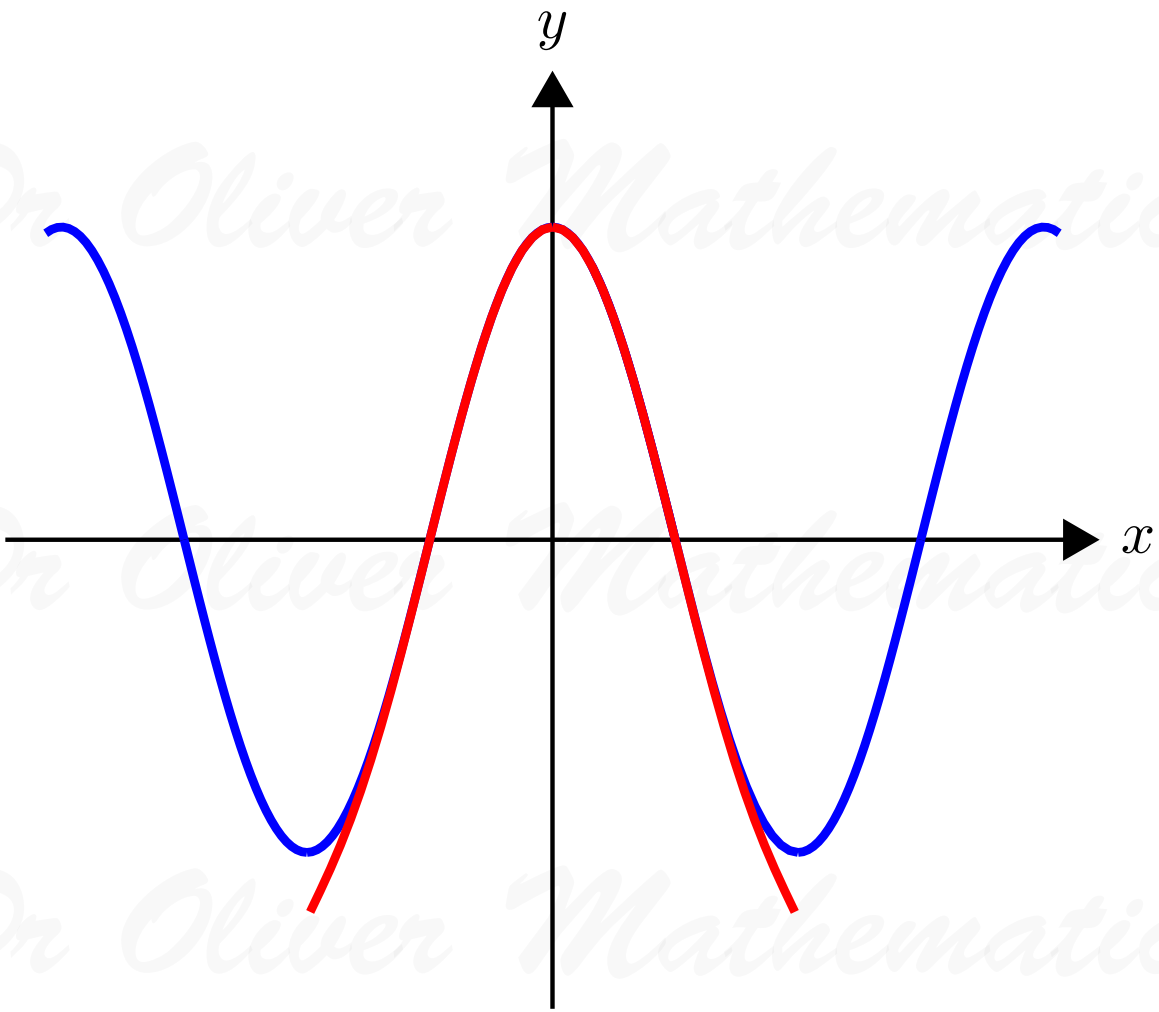
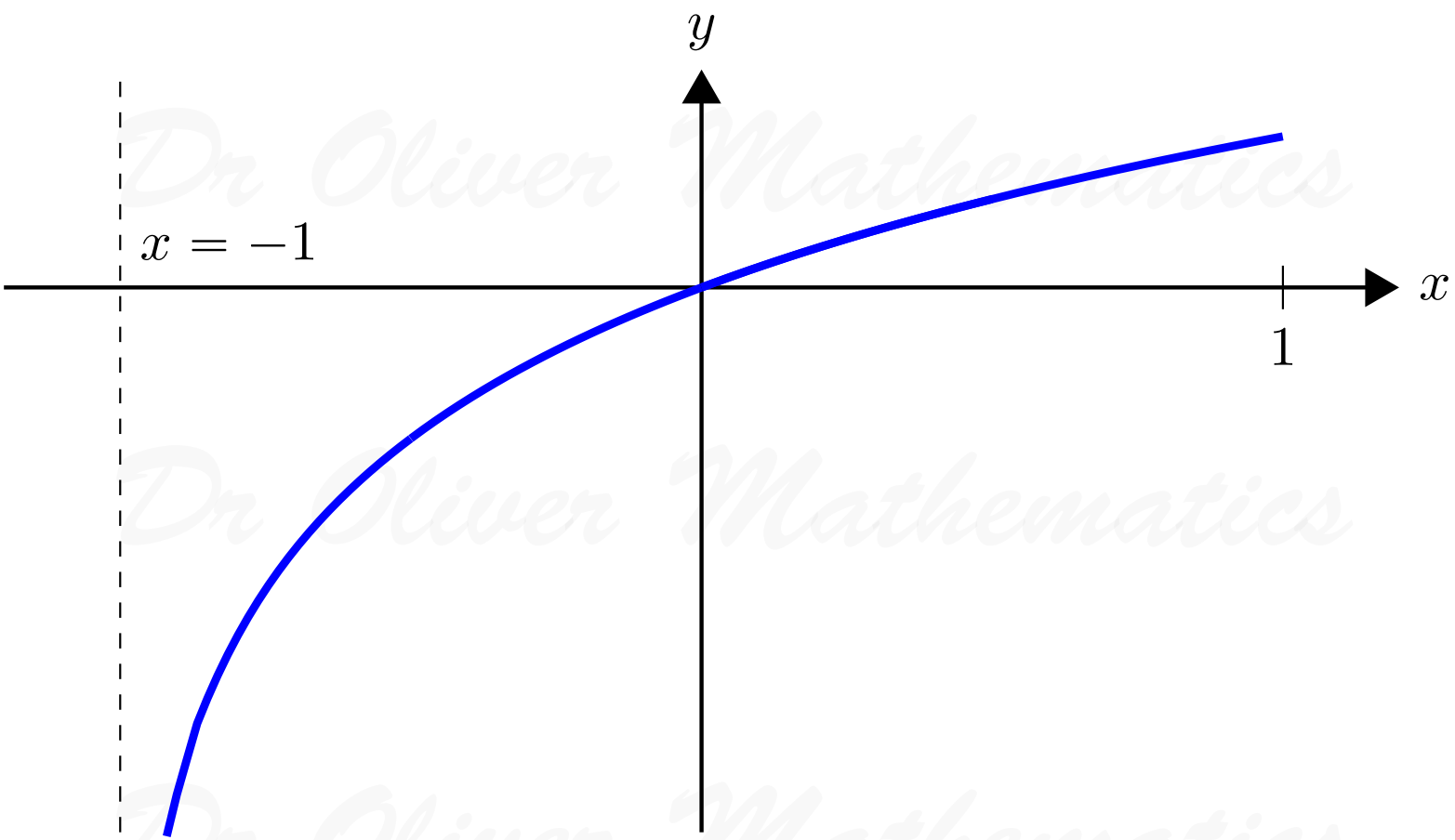


Approximating by $f(x) = 1 - \frac{1}{2!}x^2 + \frac{1}{4!}x^4 - \frac{1}{6!}x^6$

4. $y = \ln(1 + x)$, $-1 < x \leqslant 1$



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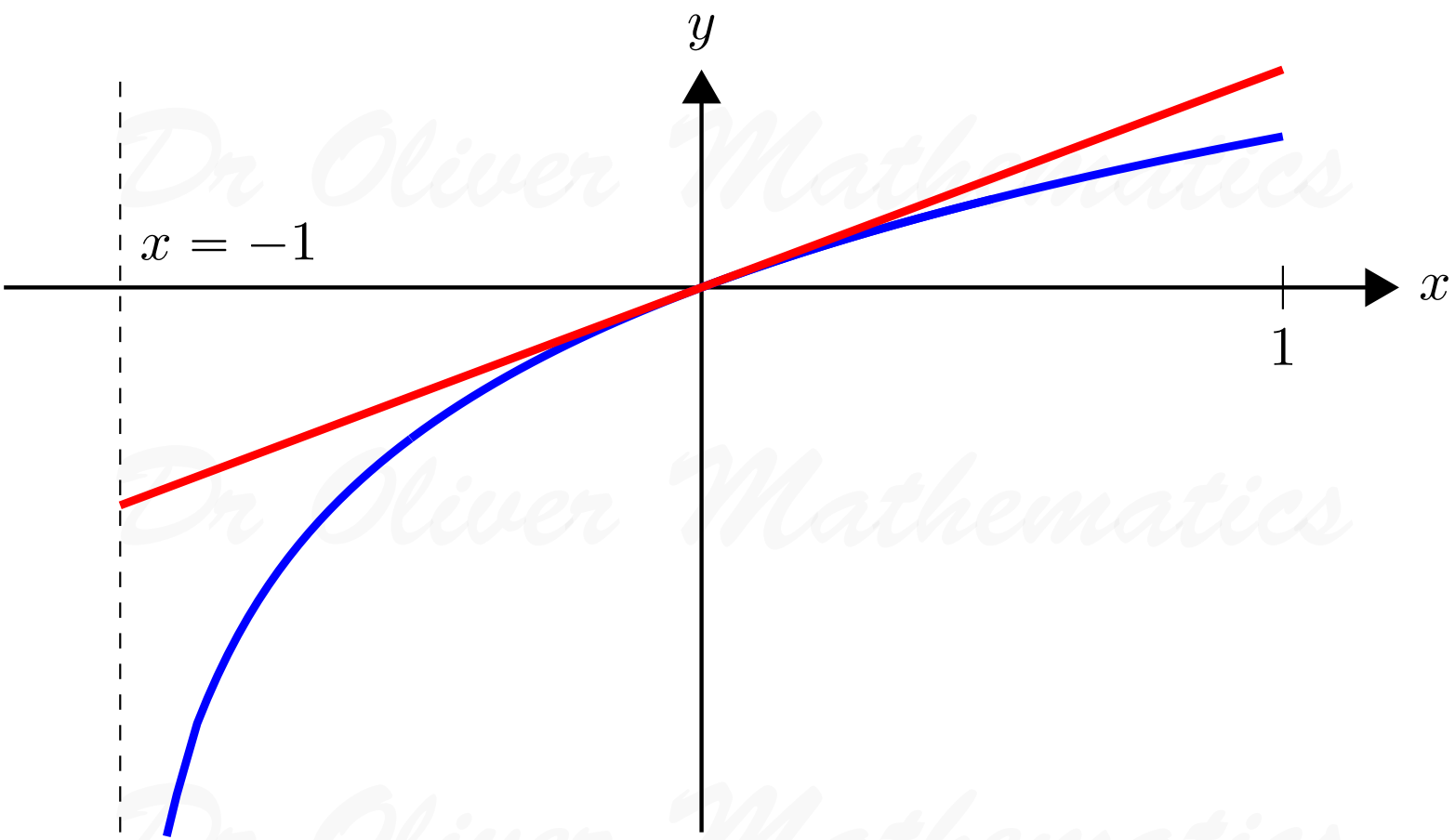

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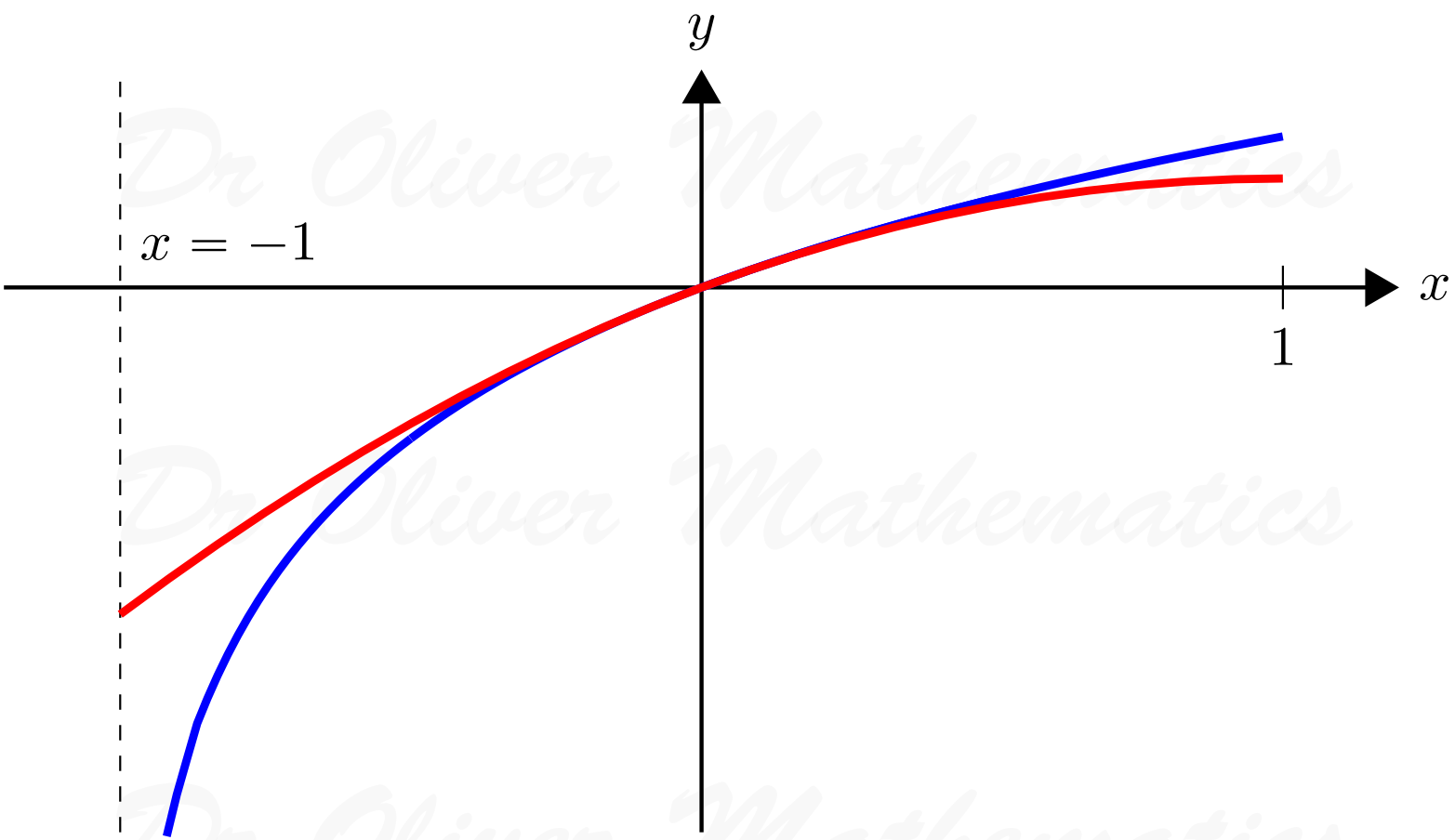

Approximated by $f(x) = x - \frac{1}{2}x^2$

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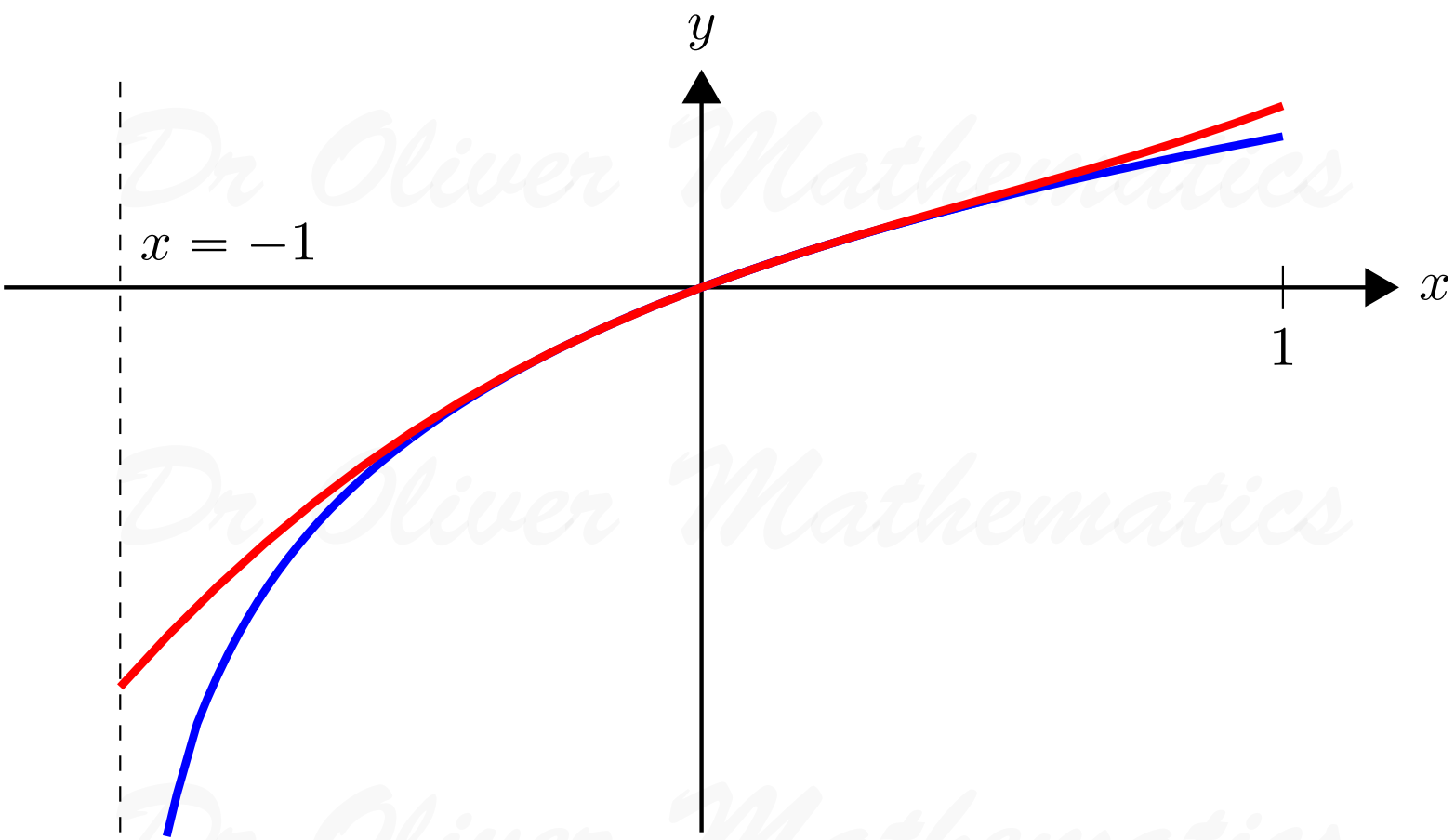

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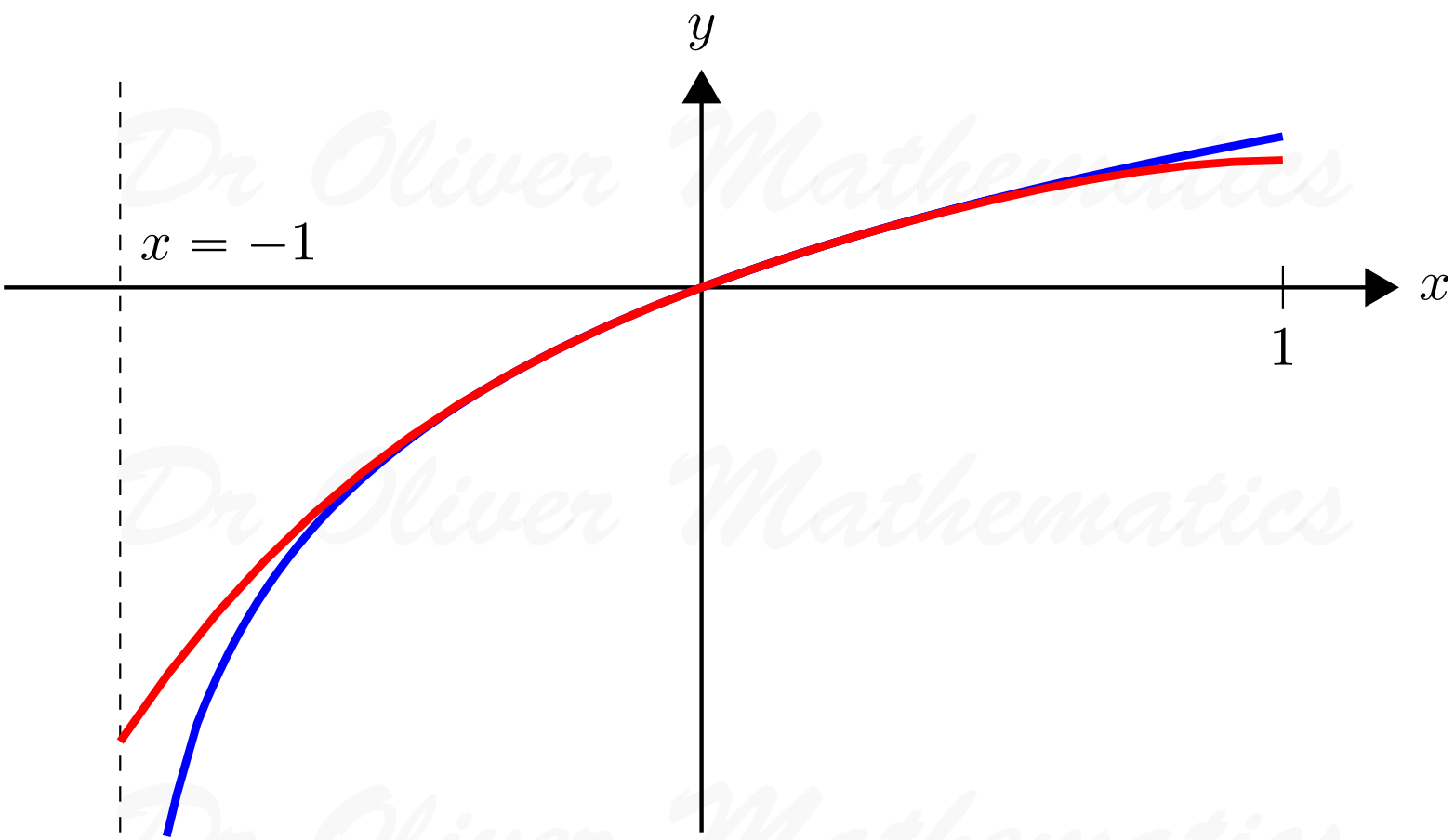

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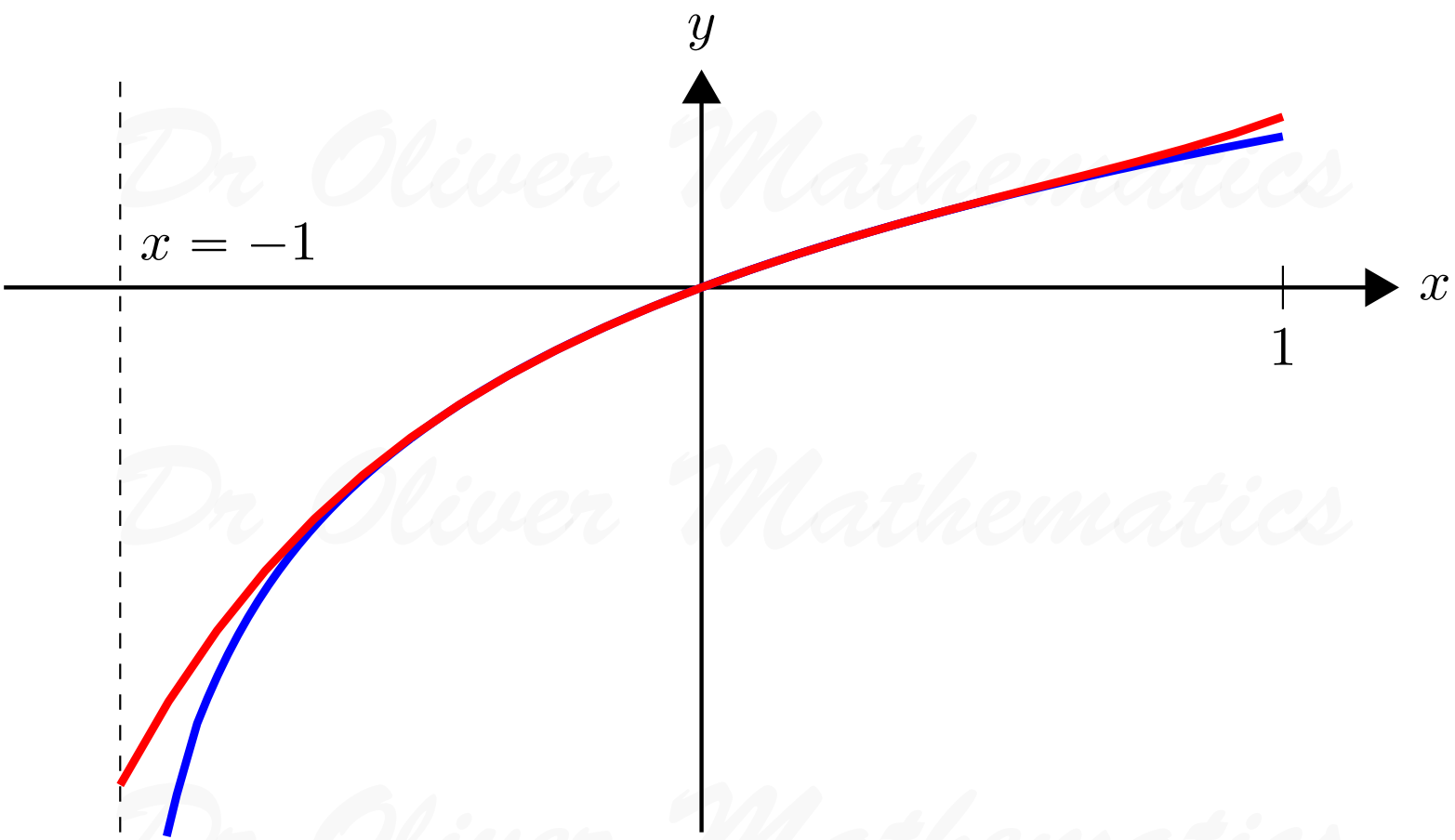

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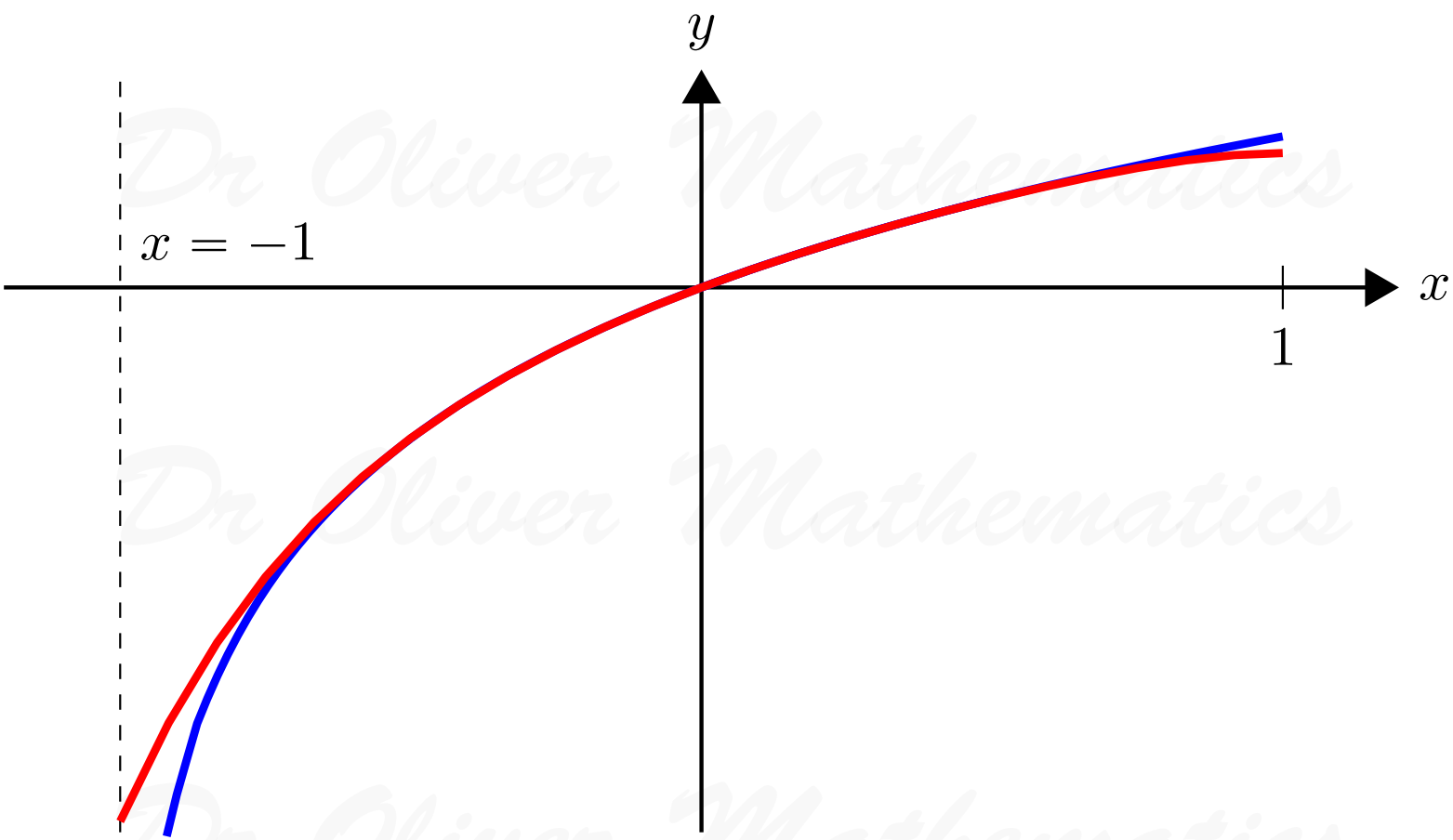

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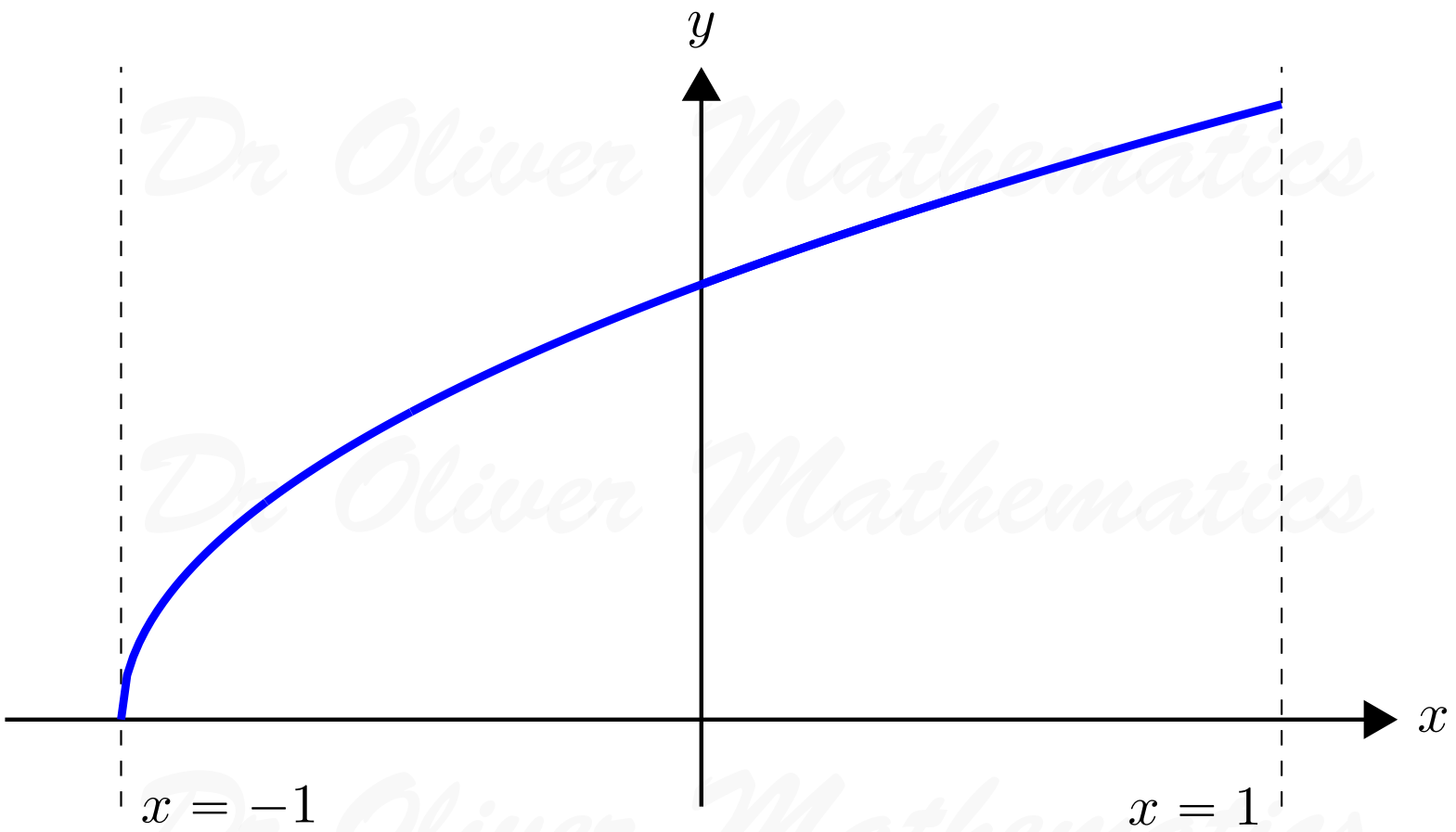
5. $y = \sqrt{1+x}$, $-1 < x < 1$



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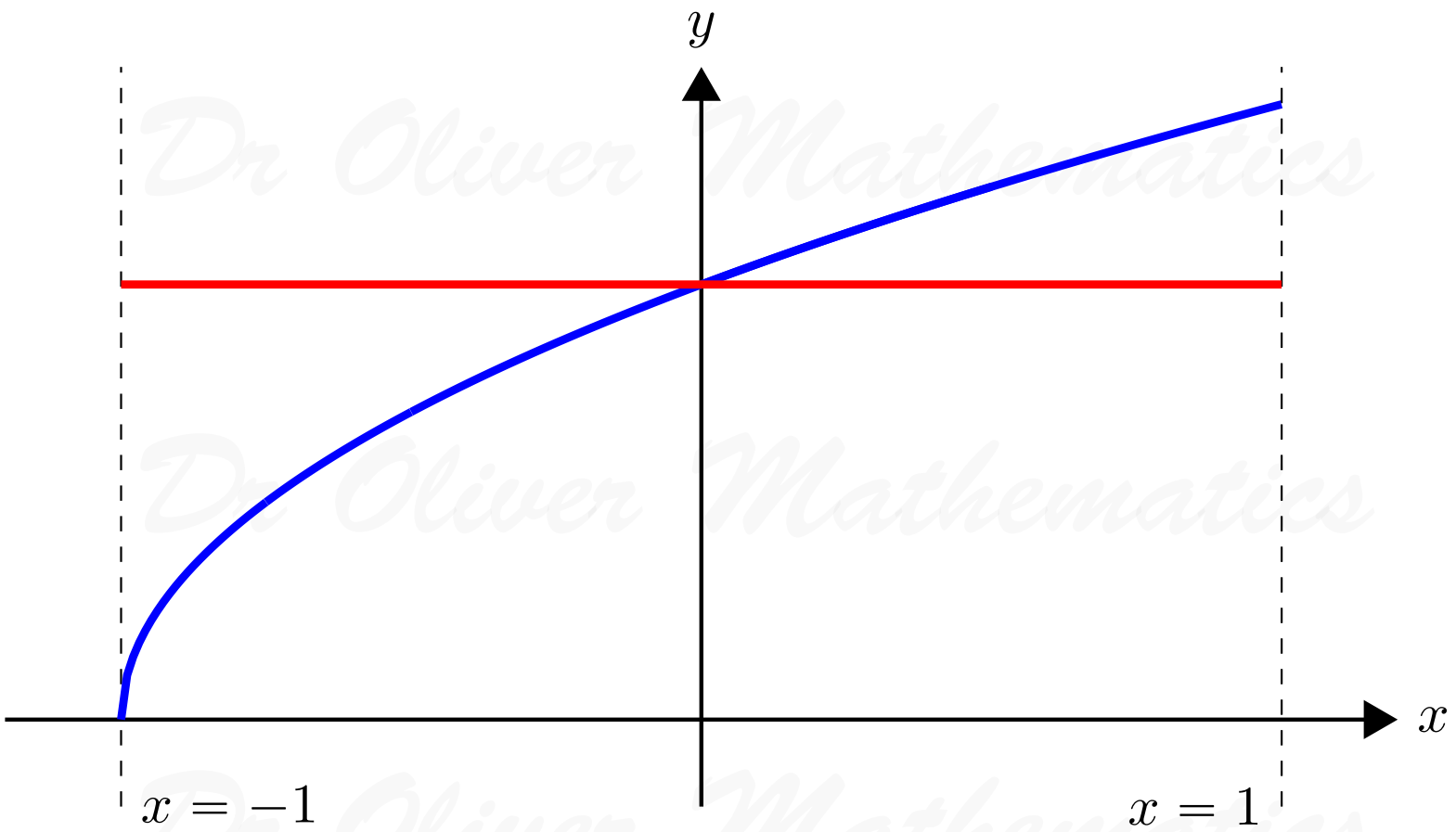

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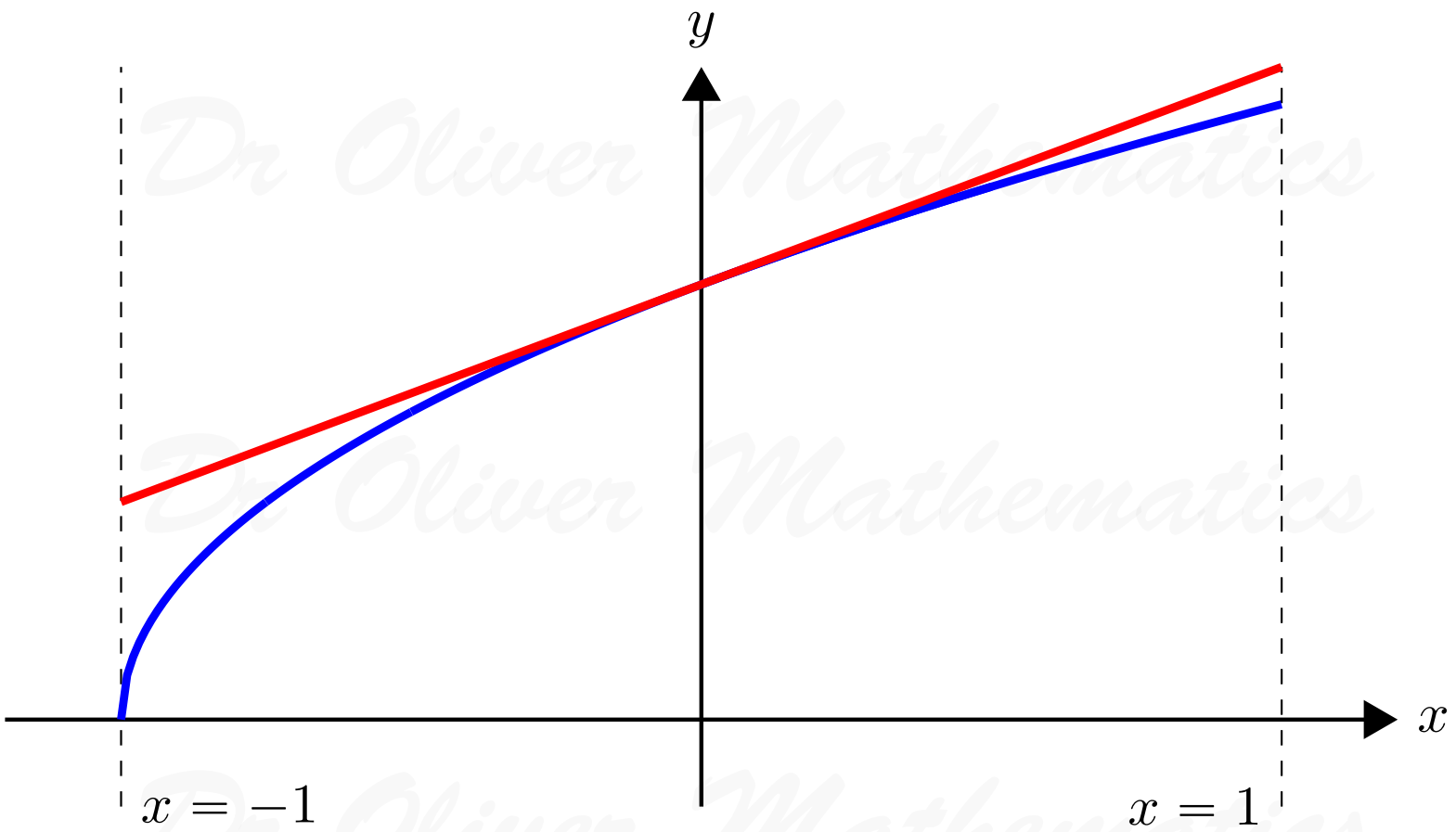

Approximated by $f(x) = 1 + \frac{1}{2}x$

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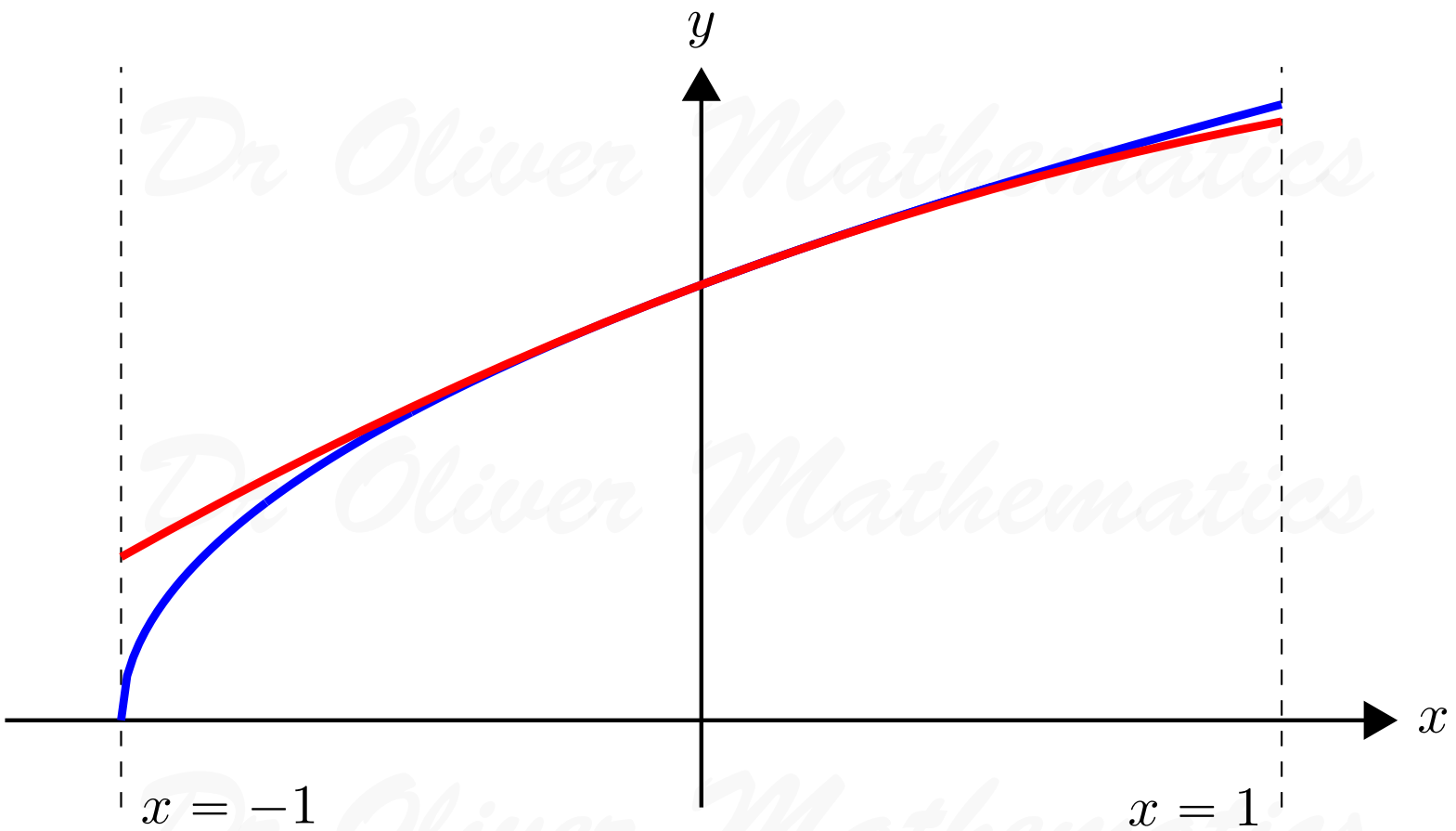

Approximated by $f(x) = 1 + \frac{1}{2}x - \frac{1}{8}x^2$

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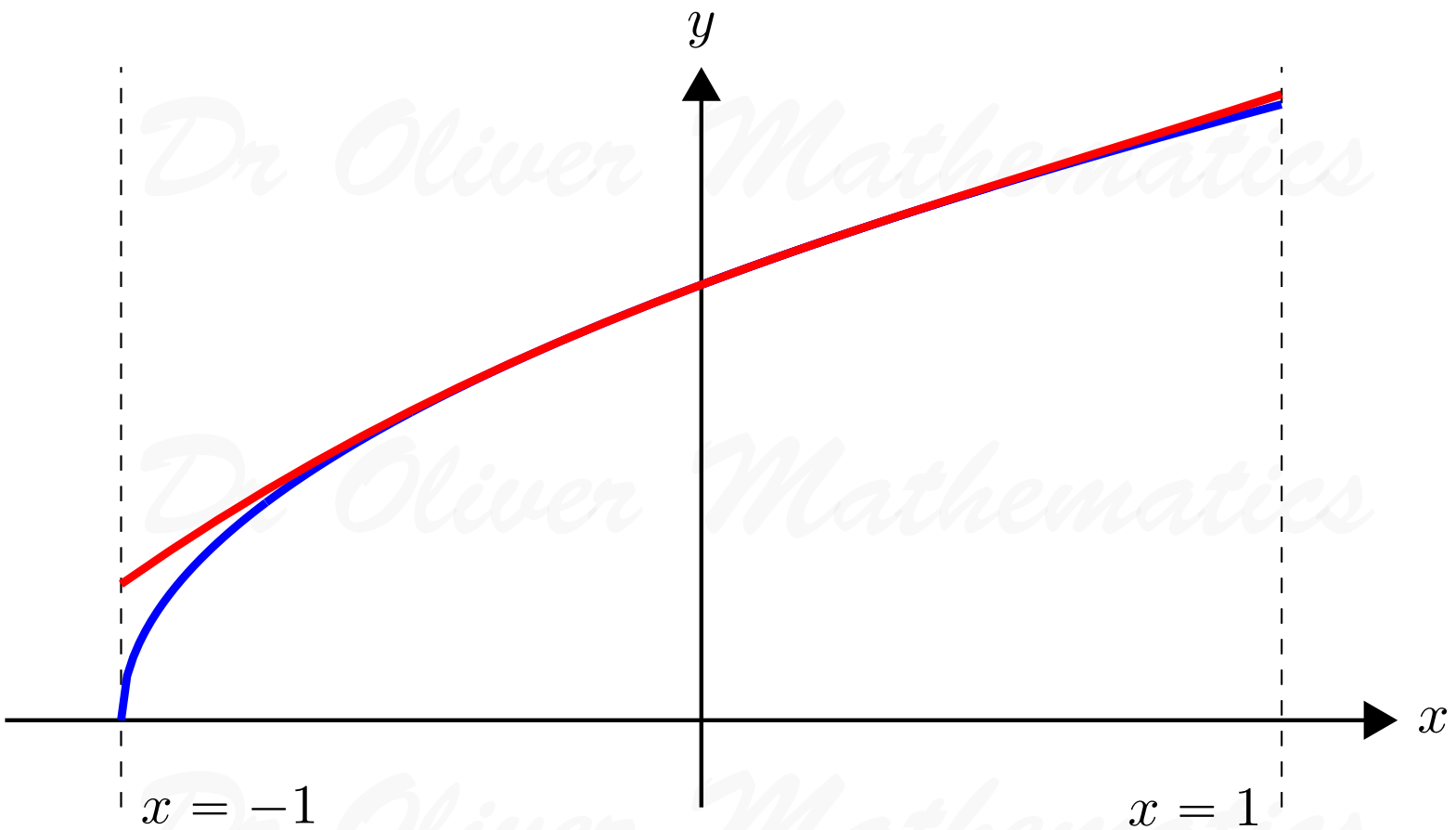
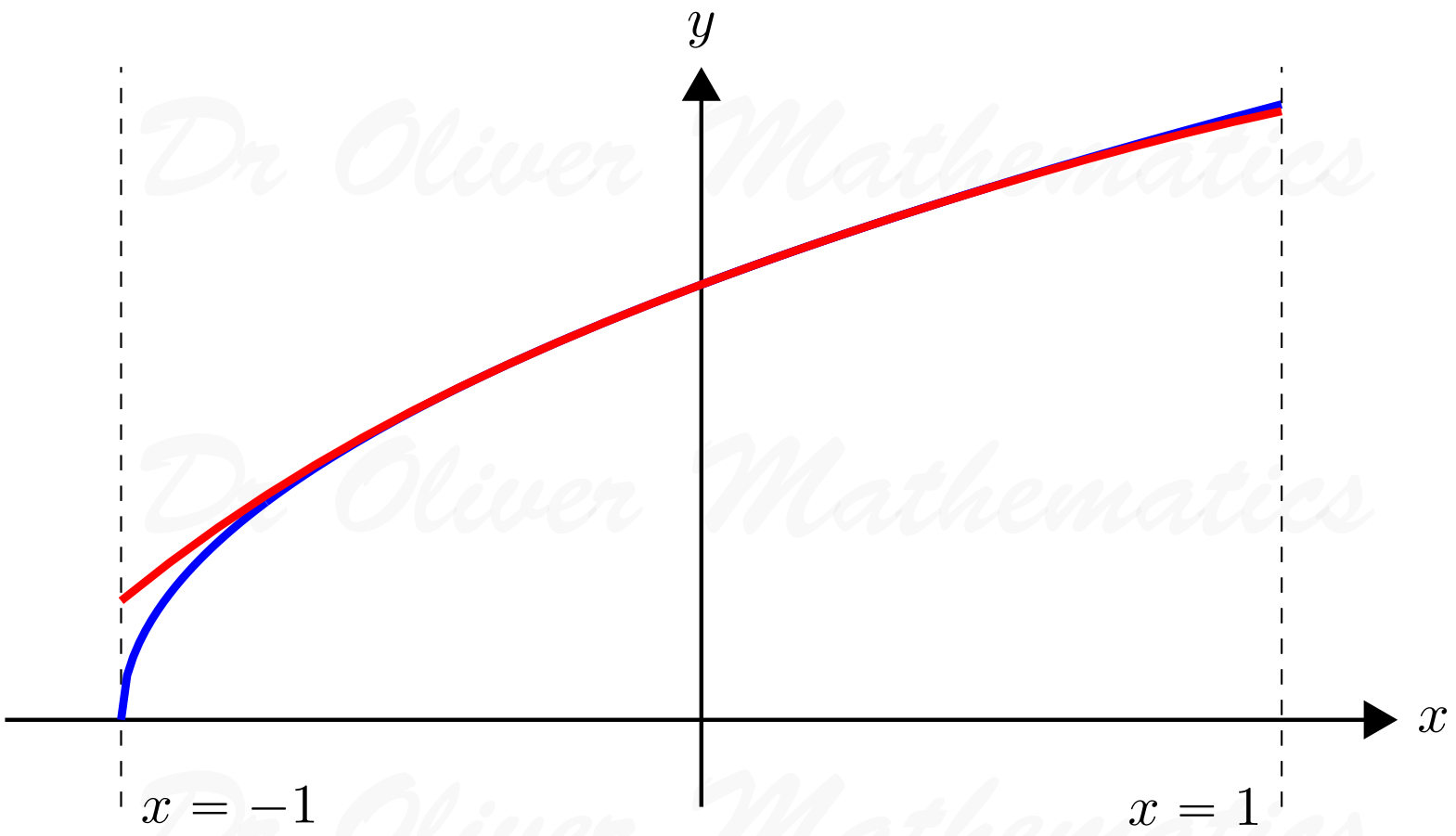


Approximated by $f(x) = 1 + \frac{1}{2}x - \frac{1}{8}x^2 + \frac{1}{16}x^3$

5. $y = \sqrt{1+x}$, $-1 < x < 1$



Approximated by $f(x) = 1 + \frac{1}{2}x - \frac{1}{8}x^2 + \frac{1}{16}x^3 - \frac{5}{128}x^4$