$$x^2 + 8x + 3 = 0$$

$$x^2 + 8x + 3 = 0$$

$$x^8 + x^5 - 7x^3 + 7 = 0$$

$$x^2 + 8x + 3 = 0$$

$$x^8 + x^5 - 7x^3 + 7 = 0$$

$$x^2 + 8x + 3 = 0$$

$$x^8 + x^5 - 7x^3 + 7 = 0$$

$$x = \frac{-8 \pm \sqrt{64 - 12}}{2}$$

$$x^2 + 8x + 3 = 0$$

$$x^8 + x^5 - 7x^3 + 7 = 0$$

$$x = \frac{-8 \pm \sqrt{64 - 12}}{2} = -4 \pm \sqrt{13}$$

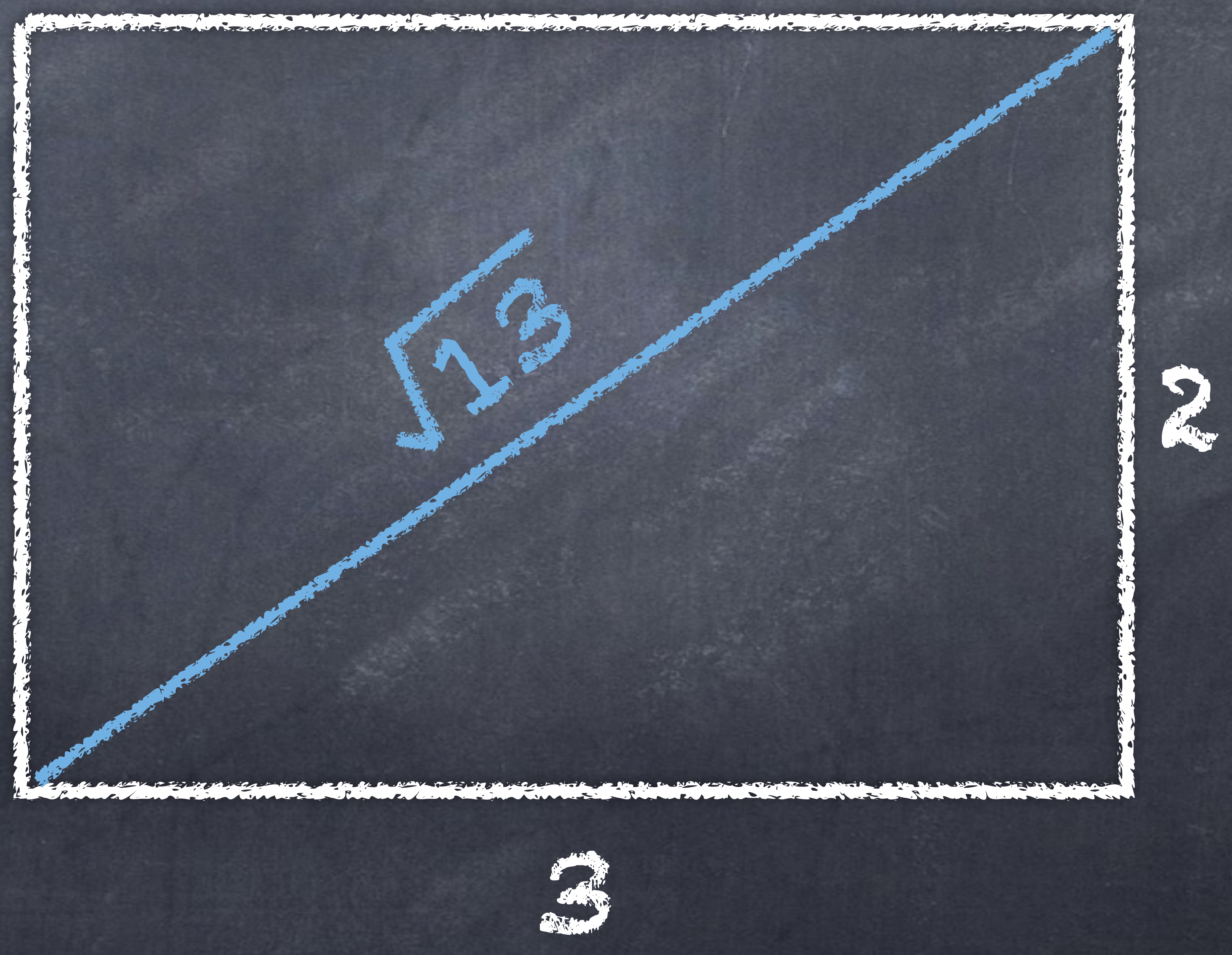
$$\sqrt{13}$$

$$\sqrt{13}$$

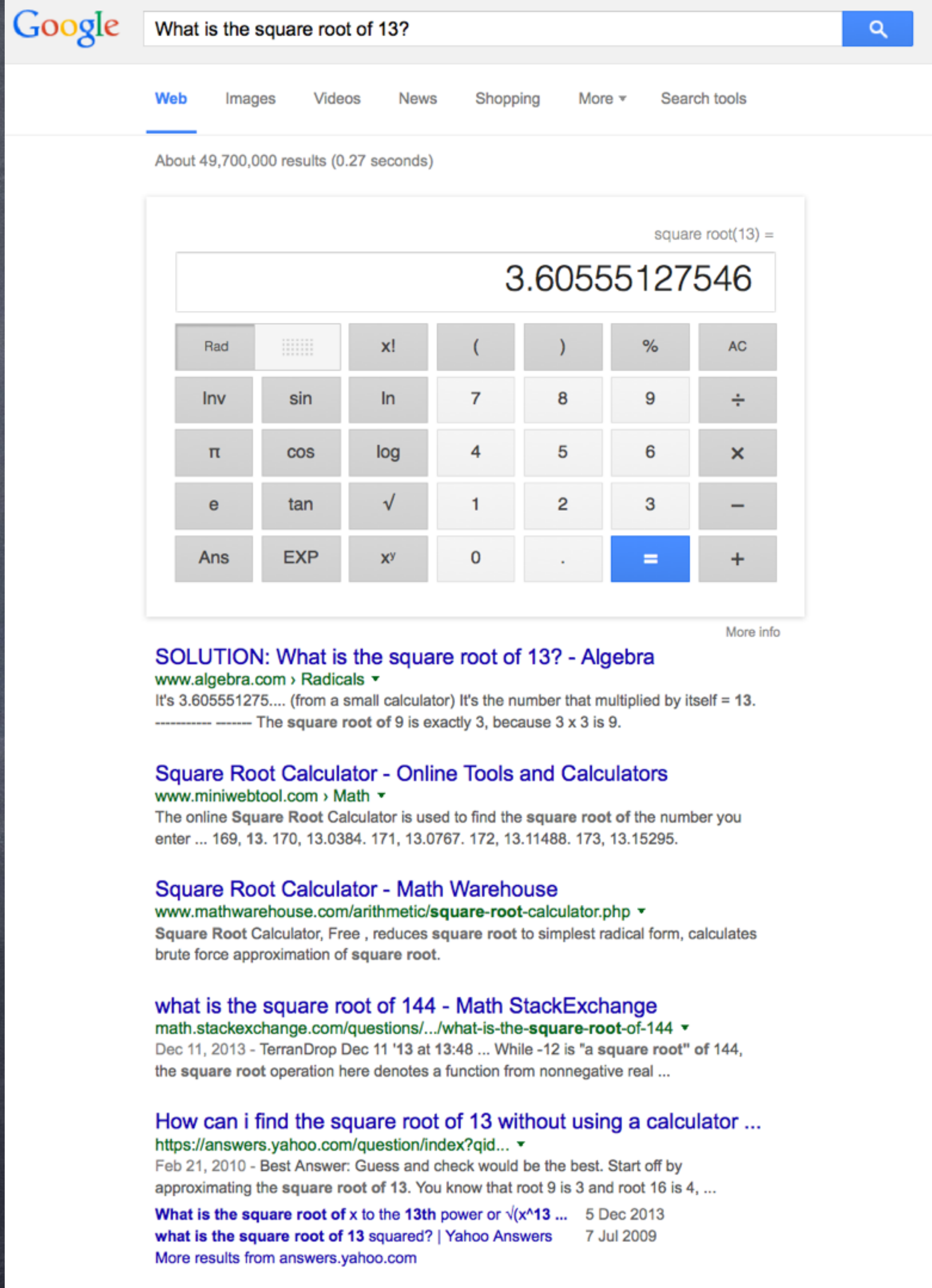
$$x^2 = 13$$

$$\sqrt{13}$$

$$x^2 = 13$$



$\sqrt{13}$


Google
What is the square root of 13?
Web
Images
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More
Search tools
About 49,700,000 results (0.27 seconds)
square root(13) =
3.60555127546
Rad
x!
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More info
SOLUTION: What is the square root of 13? - Algebra
www.algebra.com › Radicals
It's 3.605551275.... (from a small calculator) It's the number that multiplied by itself = 13.
----------- ------- The square root of 9 is exactly 3, because 3 x 3 is 9.
Square Root Calculator - Online Tools and Calculators
www.miniwebtool.com › Math
The online Square Root Calculator is used to find the square root of the number you enter ... 169, 13. 170, 13.0384. 171, 13.0767. 172, 13.11488. 173, 13.15295.
Square Root Calculator - Math Warehouse
www.mathwarehouse.com/arithmetic/square-root-calculator.php
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what is the square root of 144 - Math StackExchange
math.stackexchange.com/questions/.../what-is-the-square-root-of-144
Dec 11, 2013 - TerranDrop Dec 11 '13 at 13:48 ... While -12 is "a square root" of 144, the square root operation here denotes a function from nonnegative real ...
How can i find the square root of 13 without using a calculator ...
https://answers.yahoo.com/question/index?qid...
Feb 21, 2010 - Best Answer: Guess and check would be the best. Start off by approximating the square root of 13. You know that root 9 is 3 and root 16 is 4, ...
What is the square root of x to the 13th power or √(x^13 ... 5 Dec 2013
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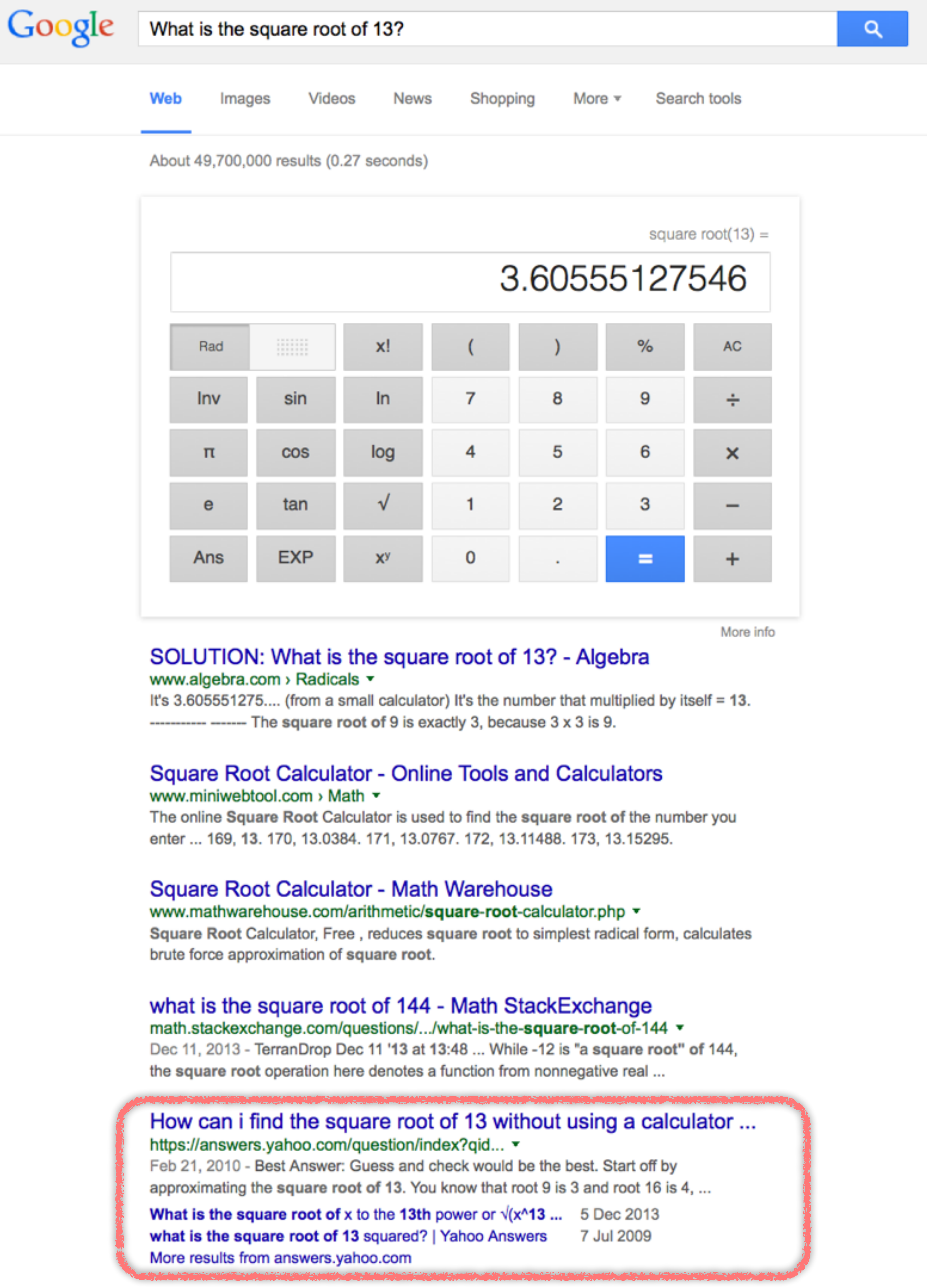
$$\sqrt{13}$$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$$\sqrt{13}$$

Answers

Relevance

Best Answer: Guess and check would be the best.

Start off by approximating the square root of 13. You know that root 9 is 3 and root 16 is 4, so root 13 must be somewhere in between.

3.5 x 3.5 = 12.25
3.6 x 3.6 = 12.96
3.7 x 3.7 = 13.69

So it seems like the answer should be between 3.6 and 3.7, but a lot closer to 3.6. Depending on how accurate your instructor wants your answer, this is when you start checking hundredths values.

3.61 x 3.61 = 13.0321 is a little closer than your previous answer, but a little higher than where you want to be. Lower the answer a little.

3.605 x 3.065 = 12.996025

This is as close as you are going to get it without driving yourself crazy with multiplication of 5 digit numbers to each other and above.

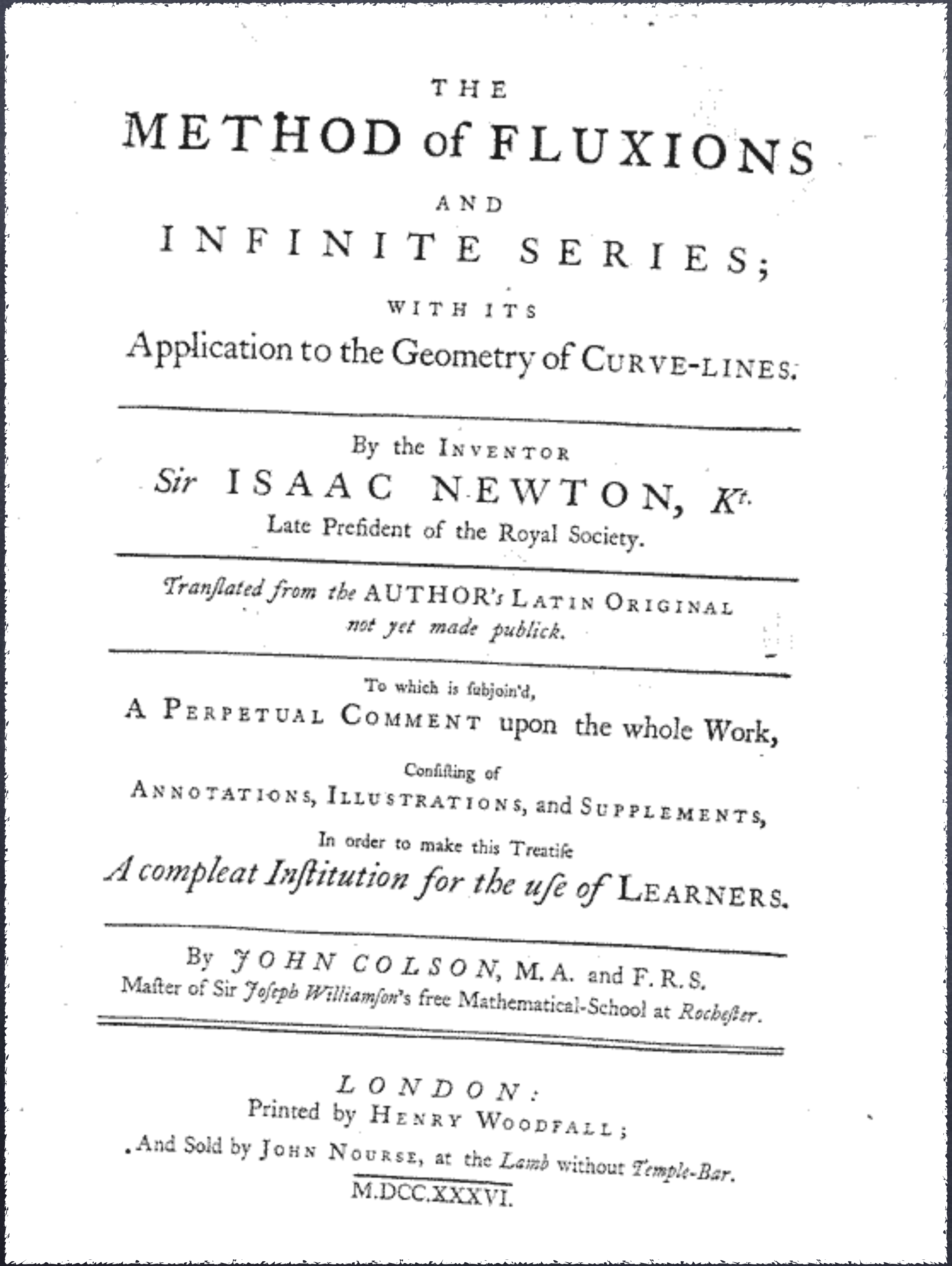
Teach4fun · 6 years ago

2 0

Comment


Isaac Newton
1642 - 1726

Das Newton-Verfahren
(ca. 1665)



THE
METHOD of FLUXIONS
AND
INFINITE SERIES;
WITH ITS
Application to the Geometry of CURVE-LINES.

By the INVENTOR
Sir ISAAC NEWTON, *Kt.*
Late Prefident of the Royal Society.

Tranflated from the AUTHOR's LATIN ORIGINAL
not yet made publick.

To which is fubjoin'd,
A PERPETUAL COMMENT upon the whole Work,
Confifting of
ANNOTATIONS, ILLUSTRATIONS, and SUPPLEMENTS,
In order to make this Treatife
A compleat Inftitution for the ufe of LEARNERS.

By *JOHN COLSON*, M.A. and F.R.S.
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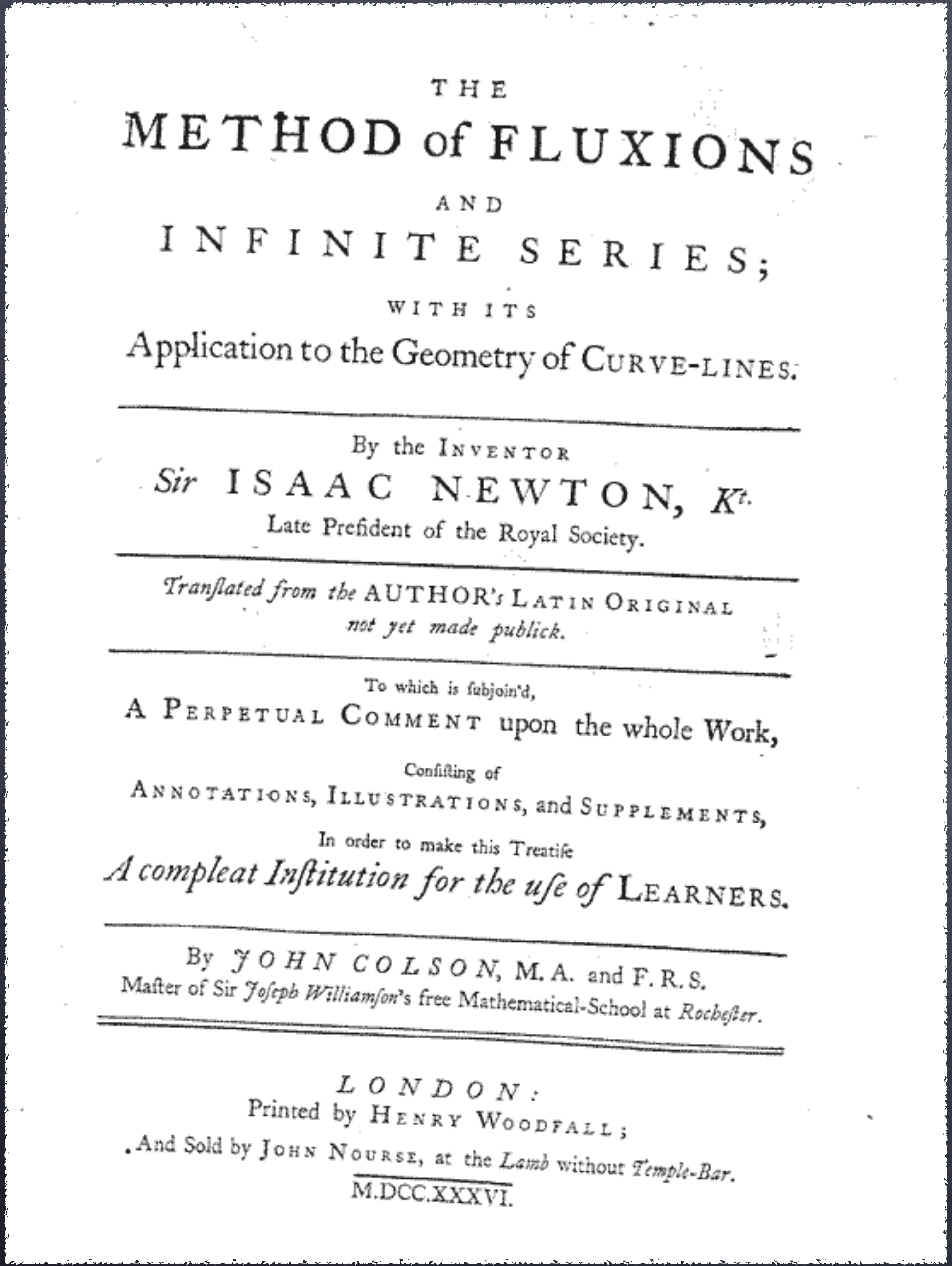
And Sold by JOHN NOURSE, at the *Lamb* without *Temple-Bar*.
M.DCC.XXXVI.



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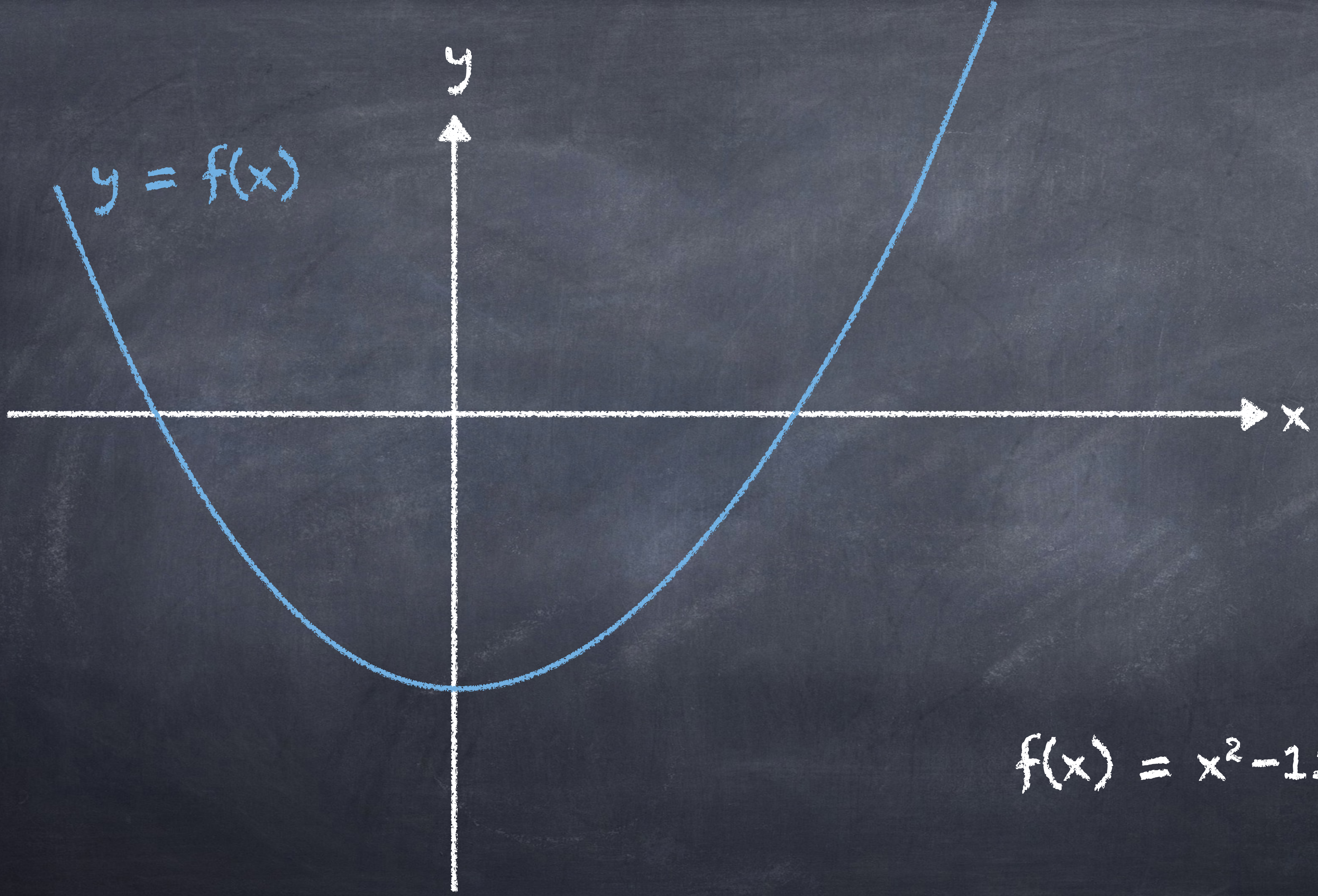
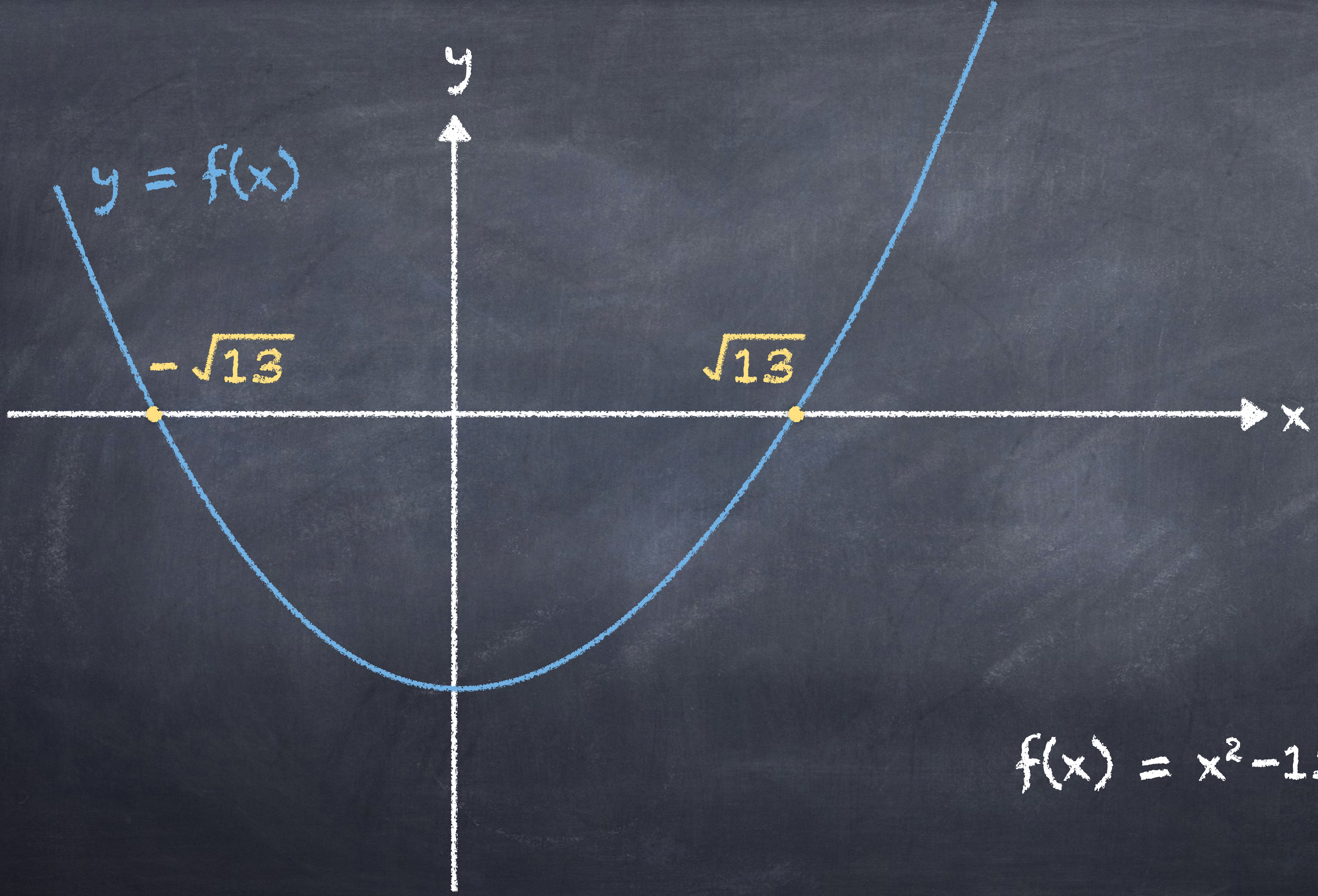
Das Newton-Verfahren (ca. 1665)

Method of Fluxions = Differentialrechnung

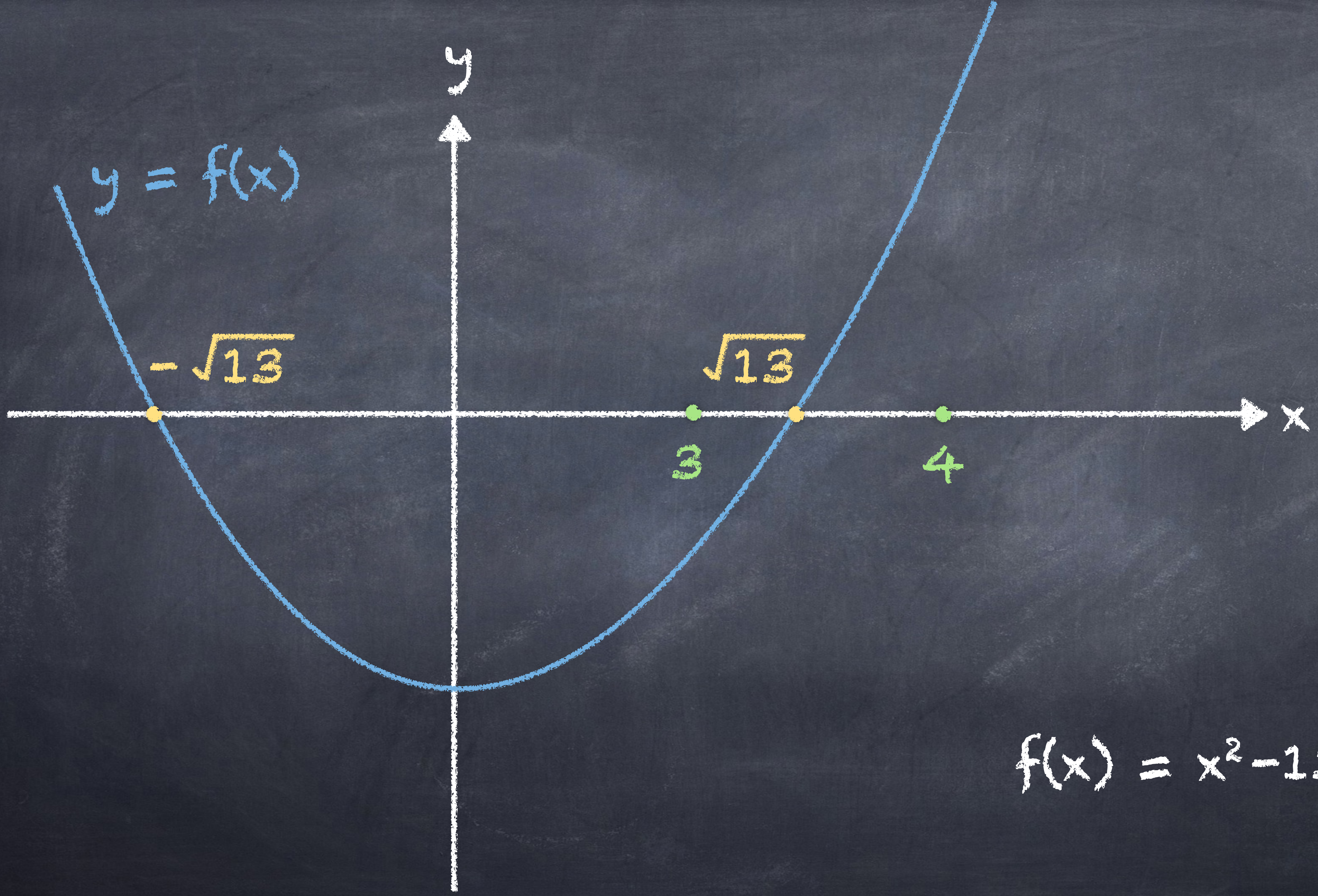
$f(x) = x^2 - 13$



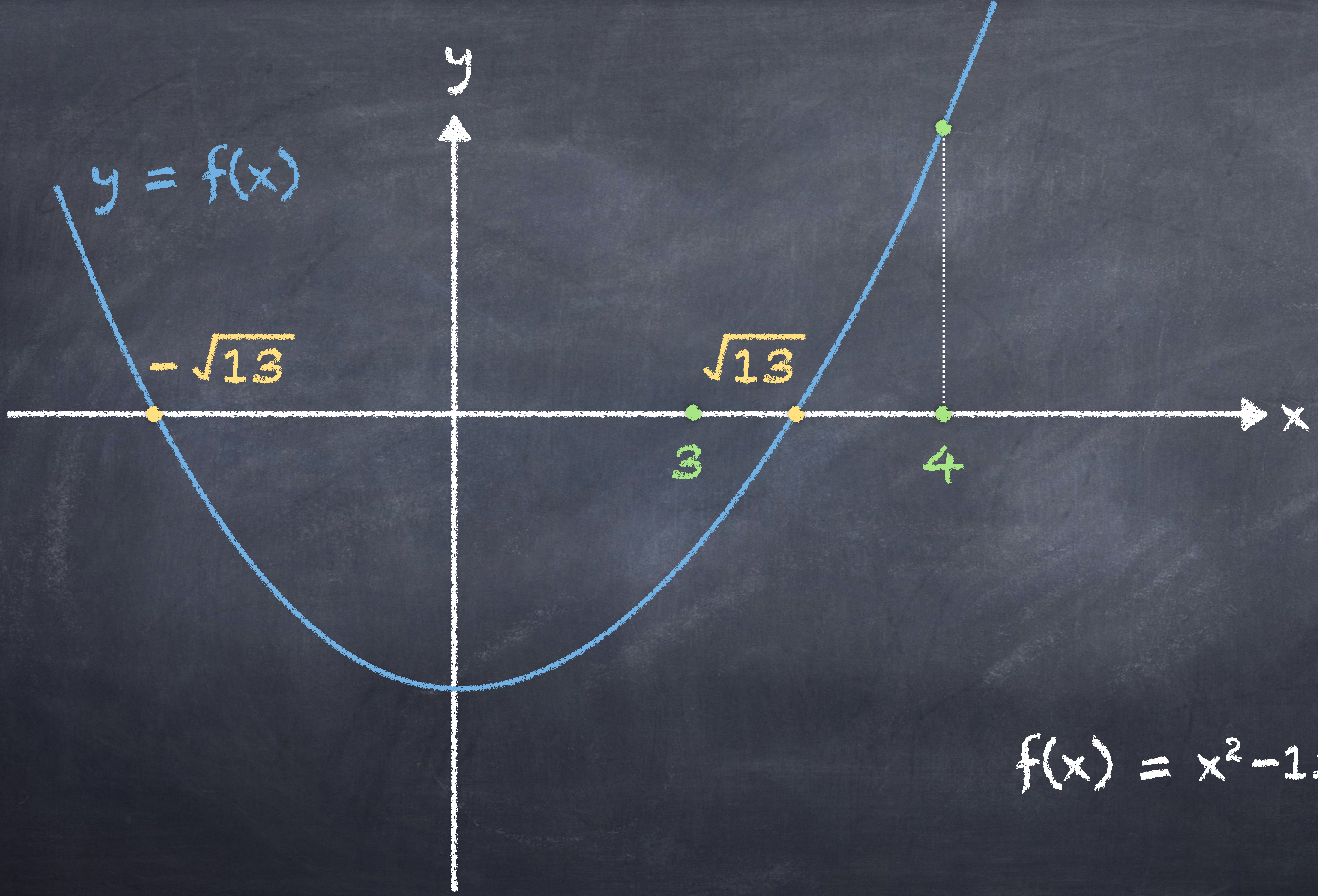
$$f(x) = x^2 - 13$$



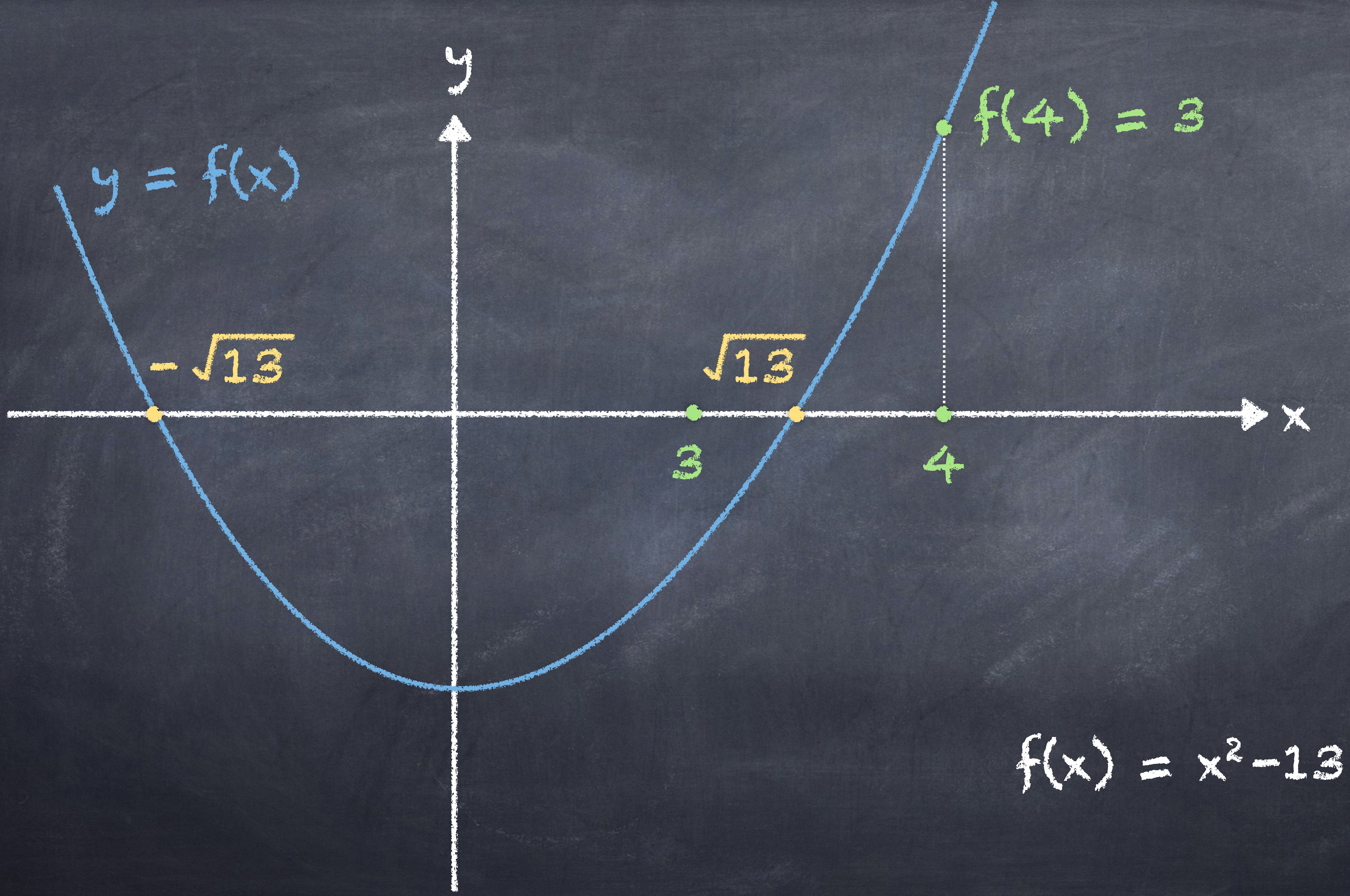
$$f(x) = x^2 - 13$$



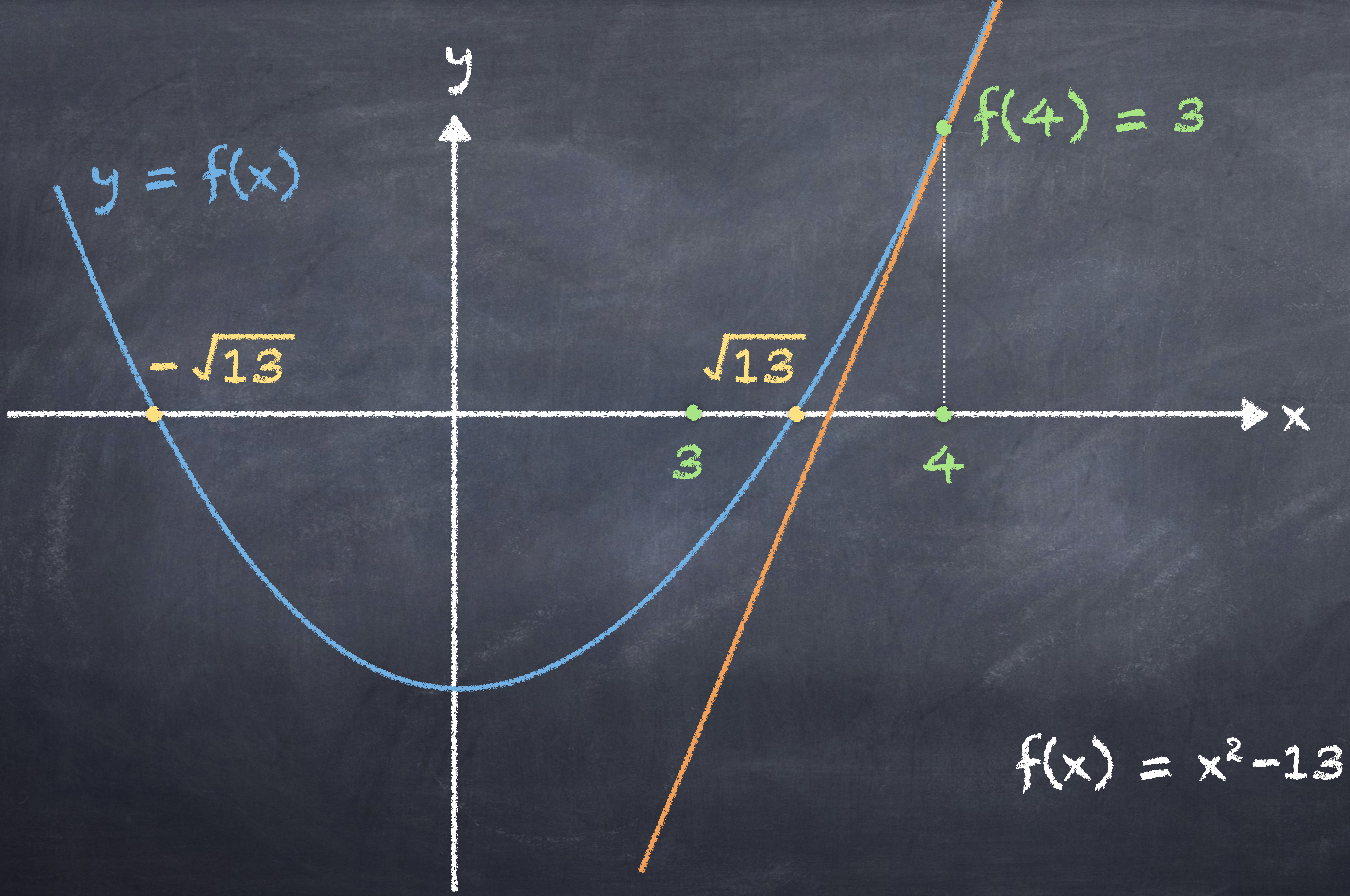
$f(x) = x^2 - 13$



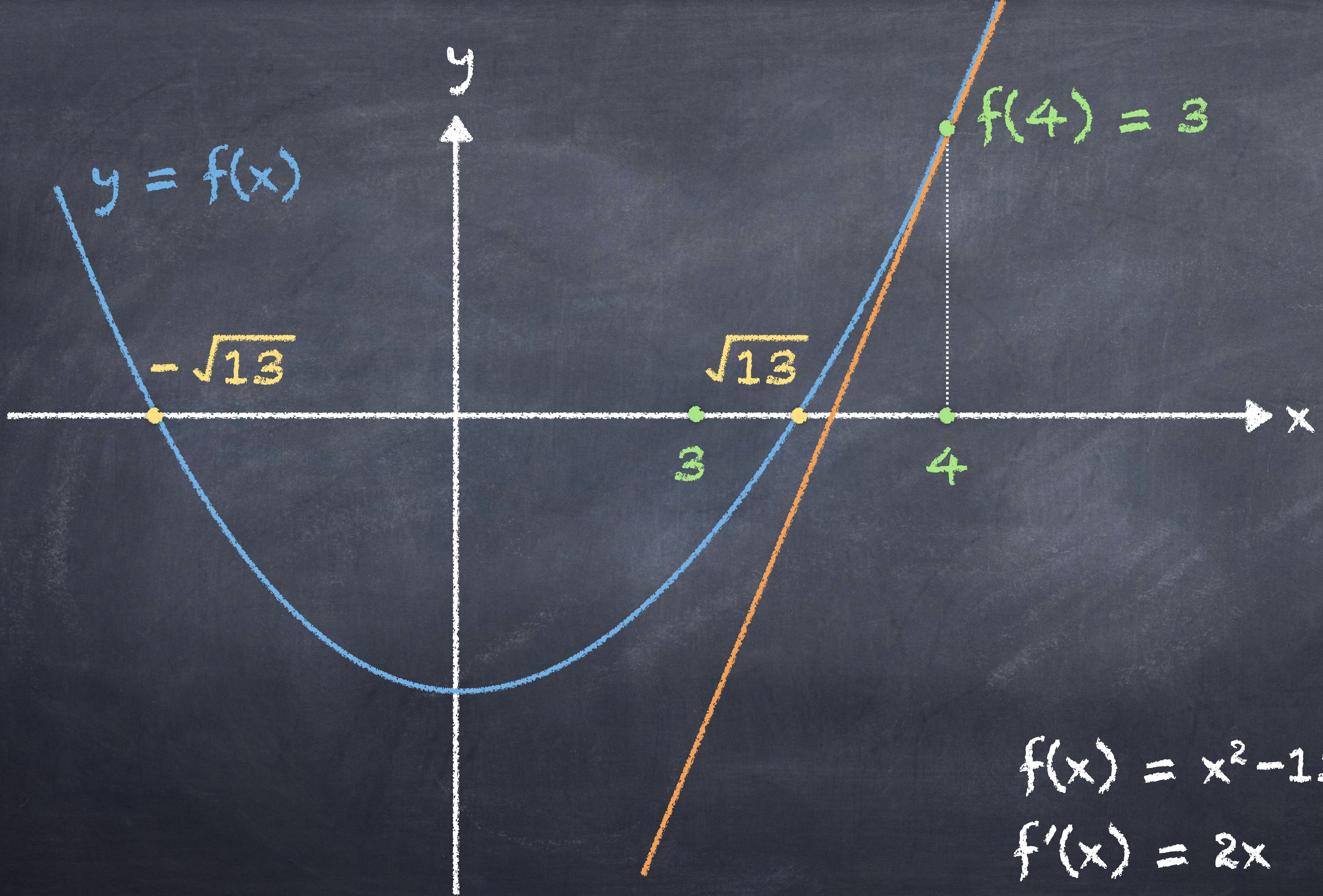
$$f(x) = x^2 - 13$$



y
x
y = f(x)
f(4) = 3
$-\sqrt{13}$
$\sqrt{13}$
3
4
$f(x) = x^2 - 13$

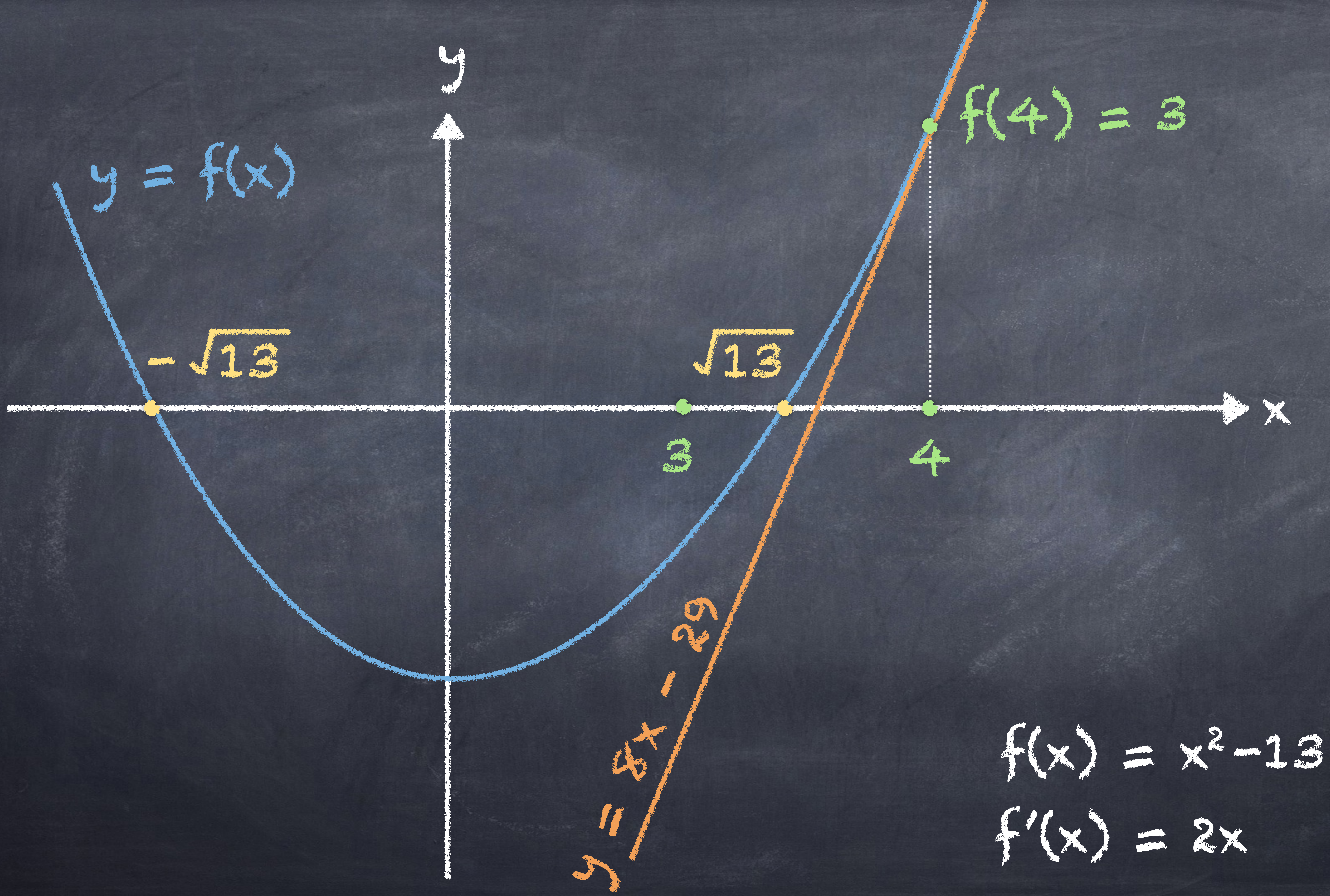


y
y = f(x)
f(4) = 3
−√13
√13
3
4
x
f(x) = x²−13



$$f(x) = x^2 - 13$$

$$f'(x) = 2x$$

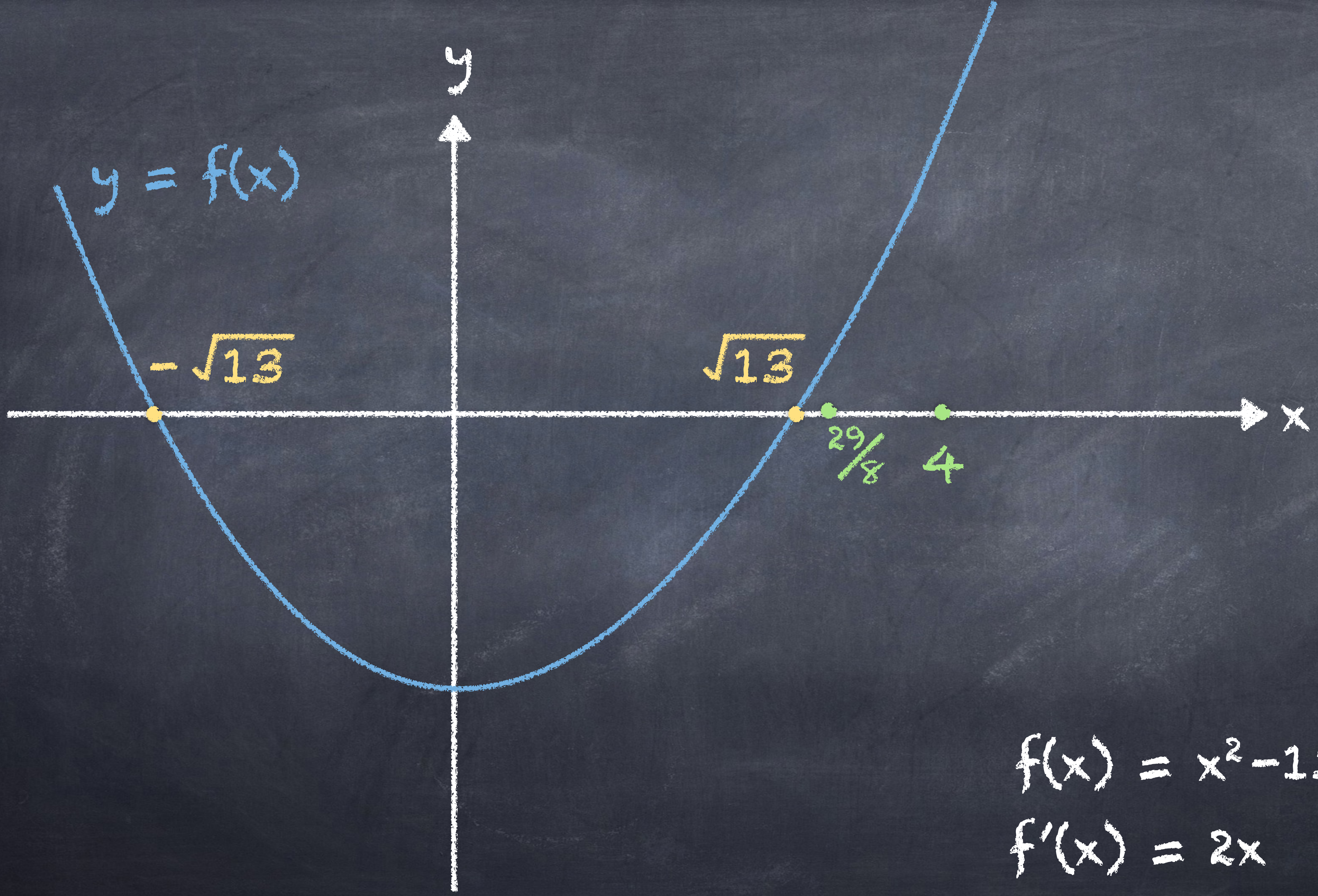


y
y = f(x)
f(4) = 3
$-\sqrt{13}$
$\sqrt{13}$
x
3
4
y = 8x − 29
$f(x) = x^2 - 13$
$f'(x) = 2x$


y
y = f(x)
f(4) = 3
$-\sqrt{13}$
$\sqrt{13}$
x
3
29/8
4
y = 8x − 29
$f(x) = x^2 - 13$
$f'(x) = 2x$

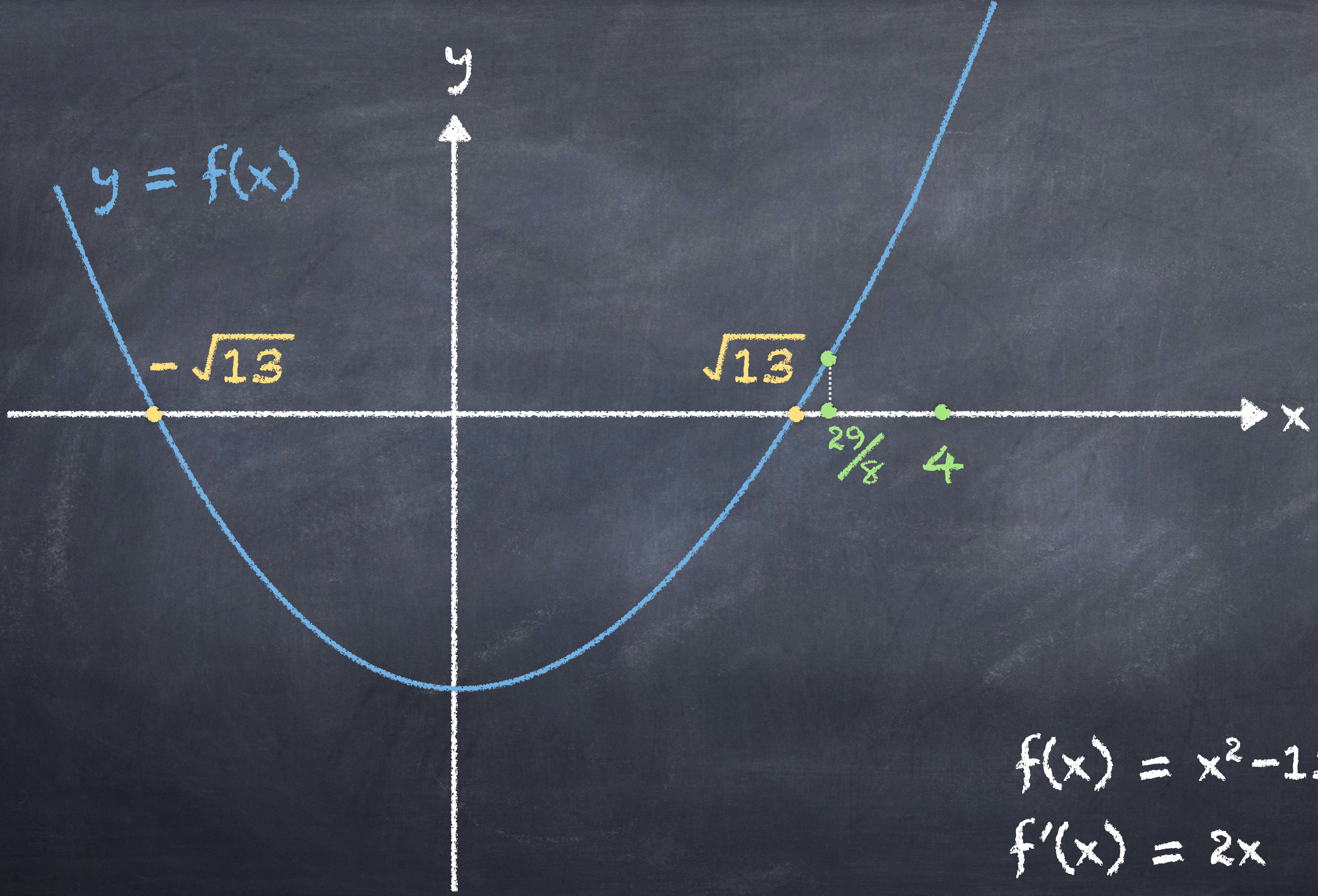

y
y = f(x)
f(4) = 3
- √13
√13
3
29/8
4
x
3.625
y = 8x - 29
f(x) = x²-13
f'(x) = 2x

y
x
y = f(x)
f(4) = 3
$-\sqrt{13}$
$\sqrt{13}$
3
29/8
4
3.625
3.60555...
y = 8x − 29
$f(x) = x^2 - 13$
$f'(x) = 2x$



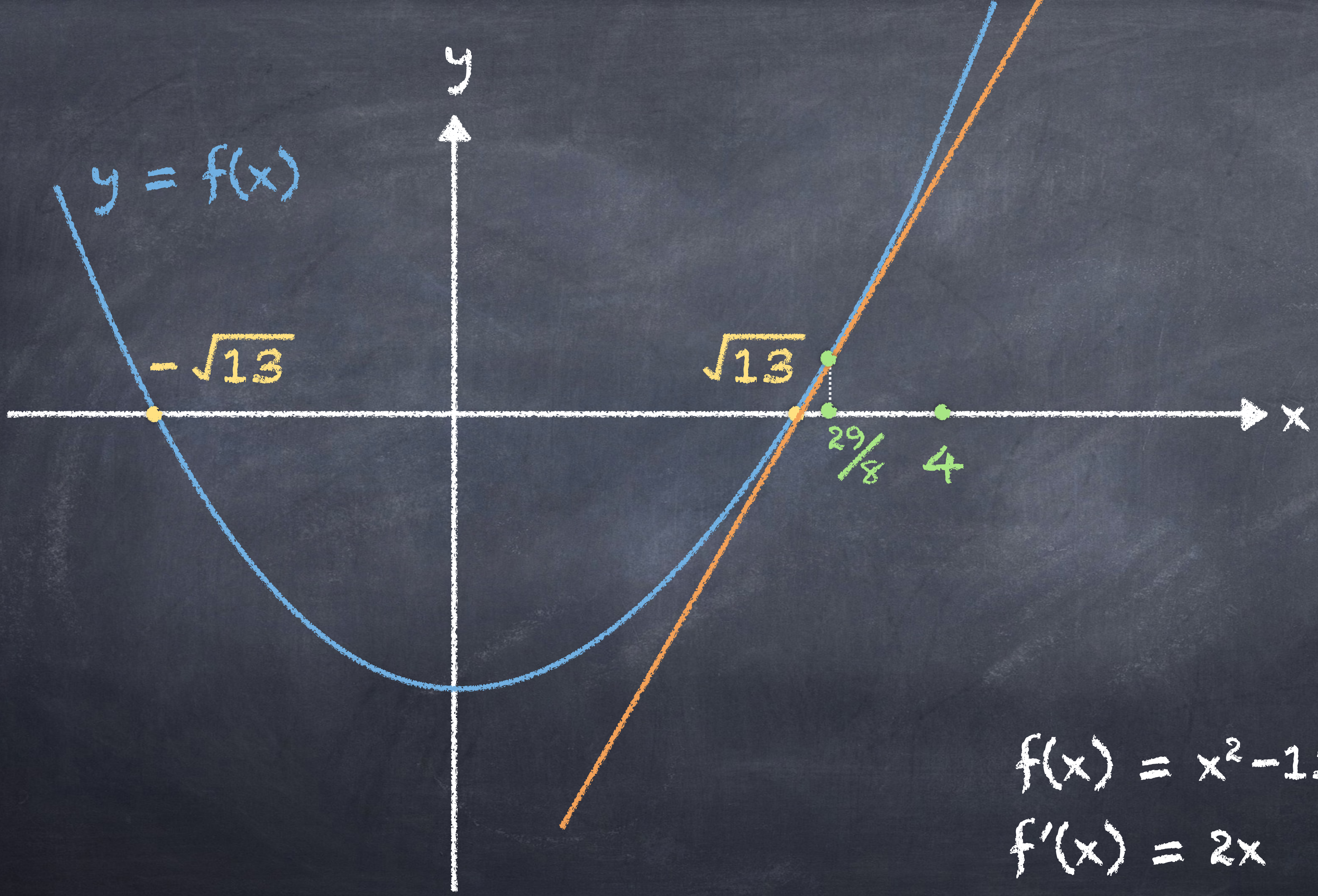
$$f(x) = x^2 - 13$$

$$f'(x) = 2x$$



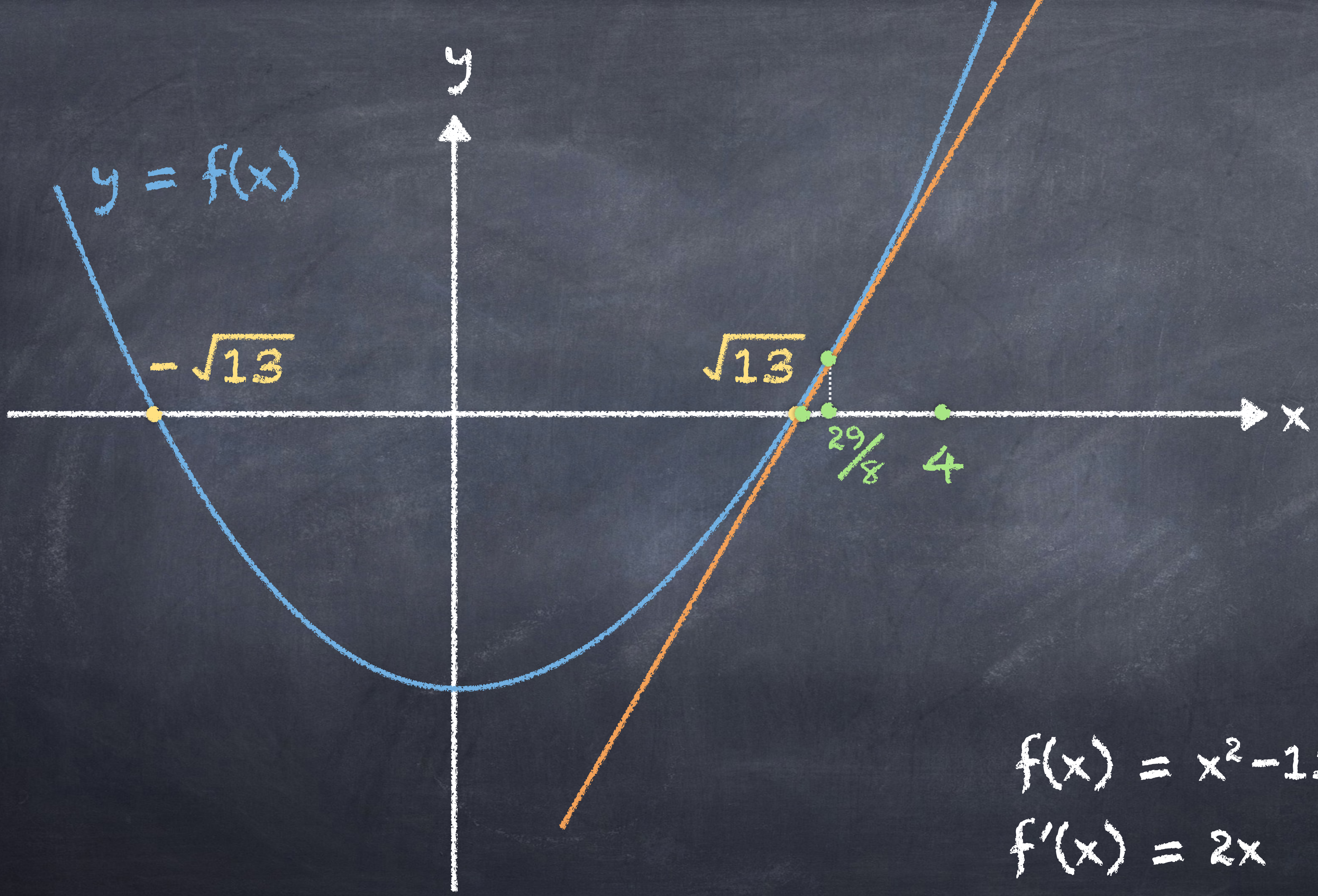
$$f(x) = x^2 - 13$$

$$f'(x) = 2x$$



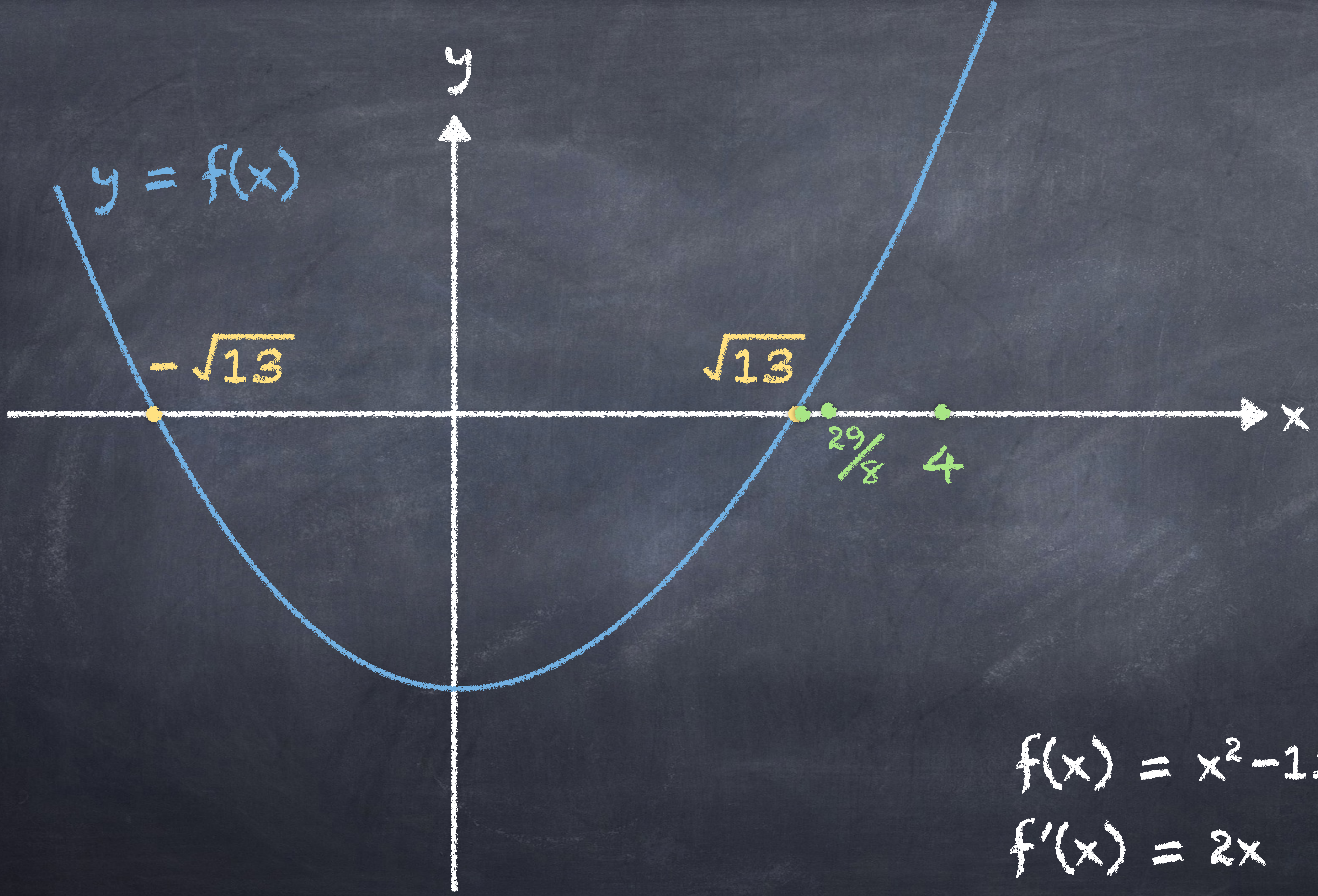
$$f(x) = x^2 - 13$$

$$f'(x) = 2x$$



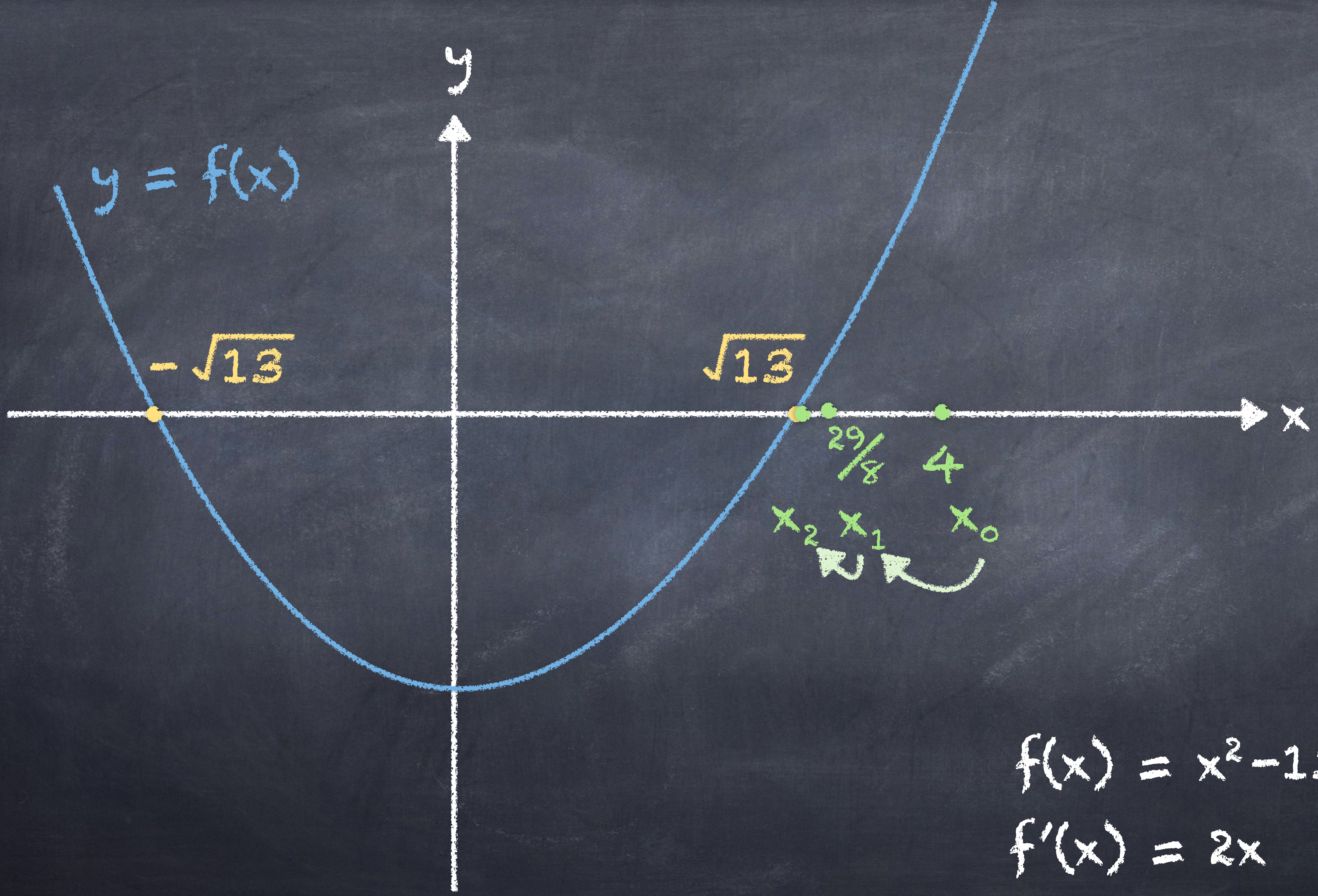
$$f(x) = x^2 - 13$$

$$f'(x) = 2x$$



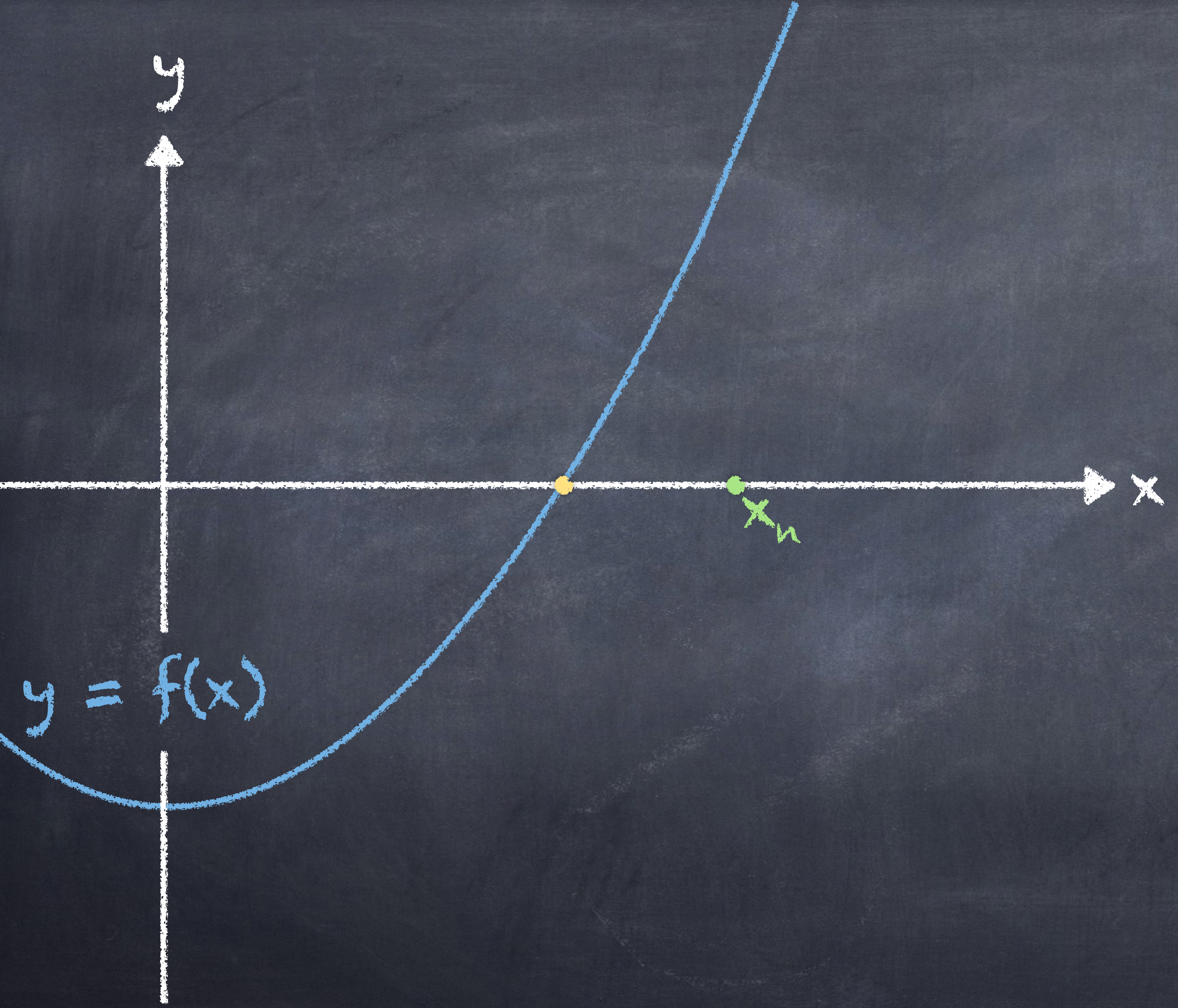
$$f(x) = x^2 - 13$$

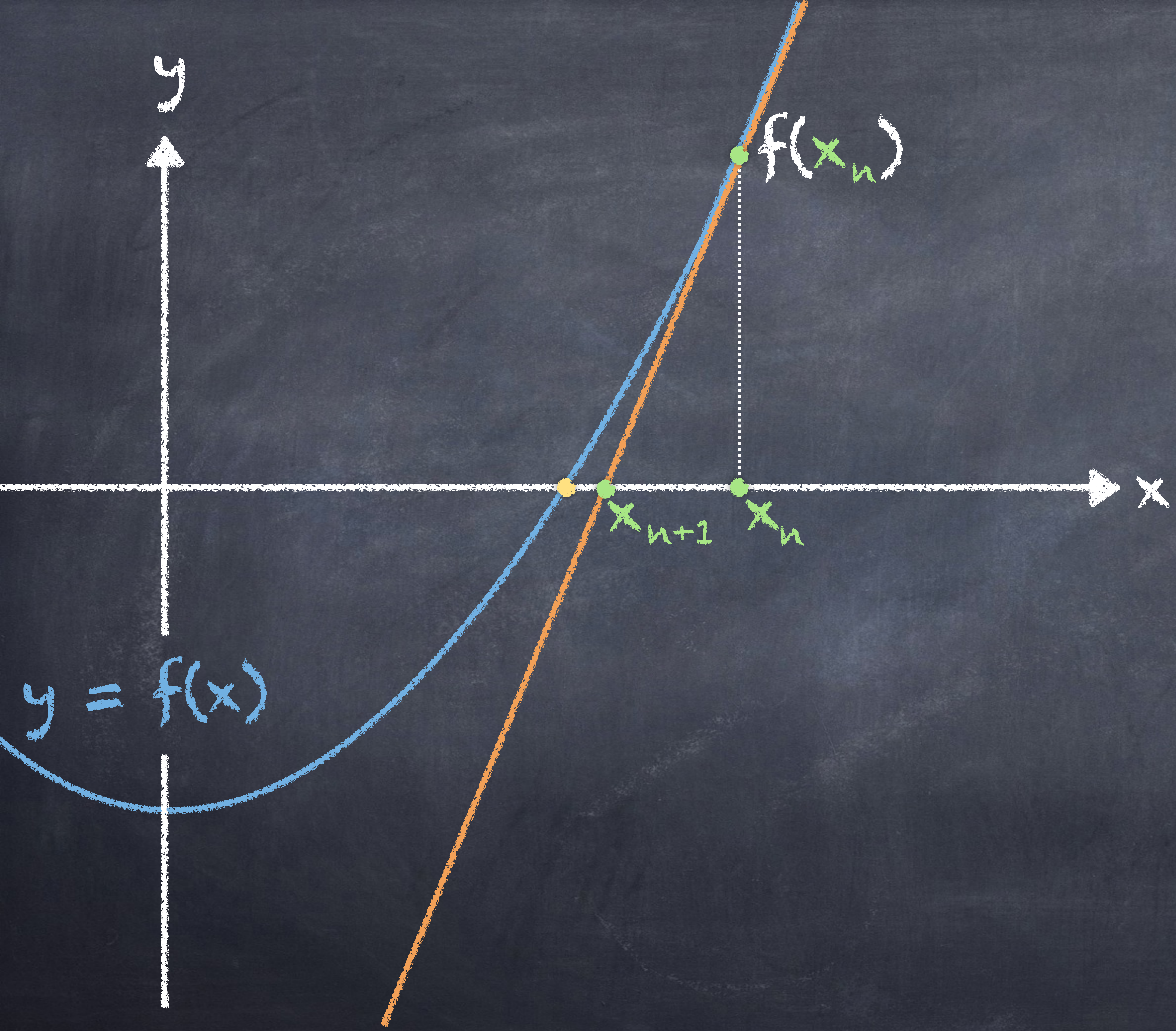
$$f'(x) = 2x$$

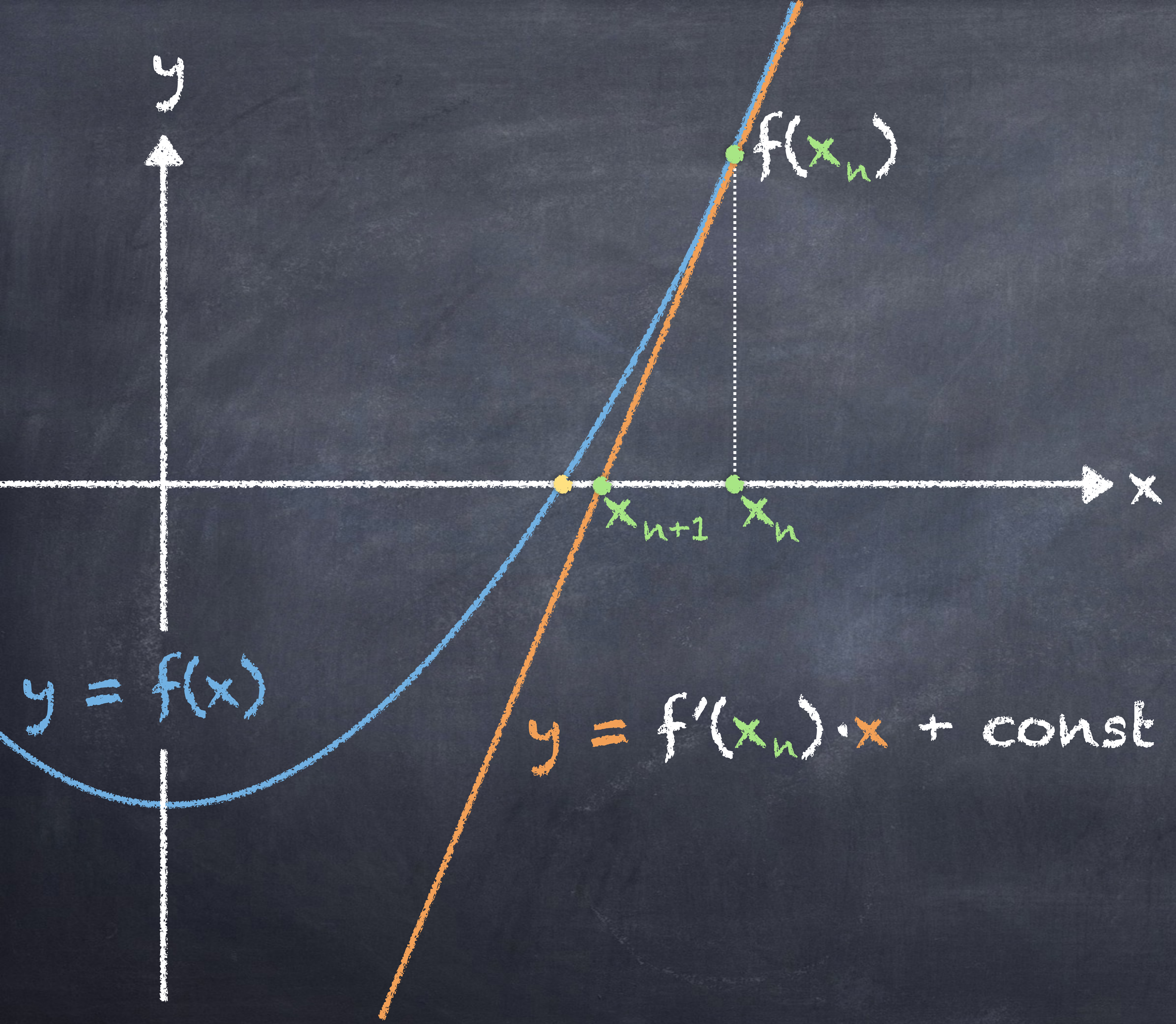


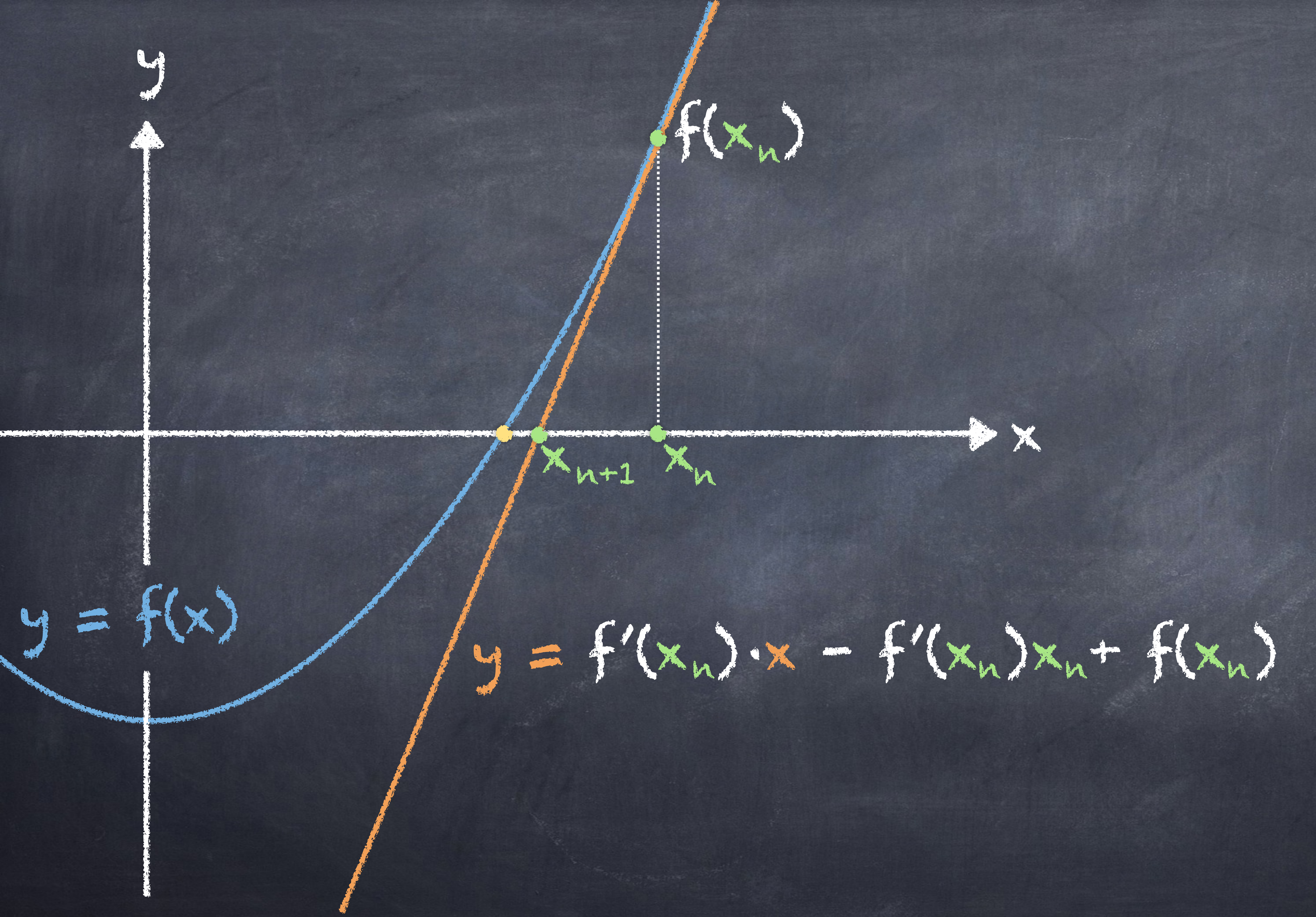
$$f(x) = x^2 - 13$$

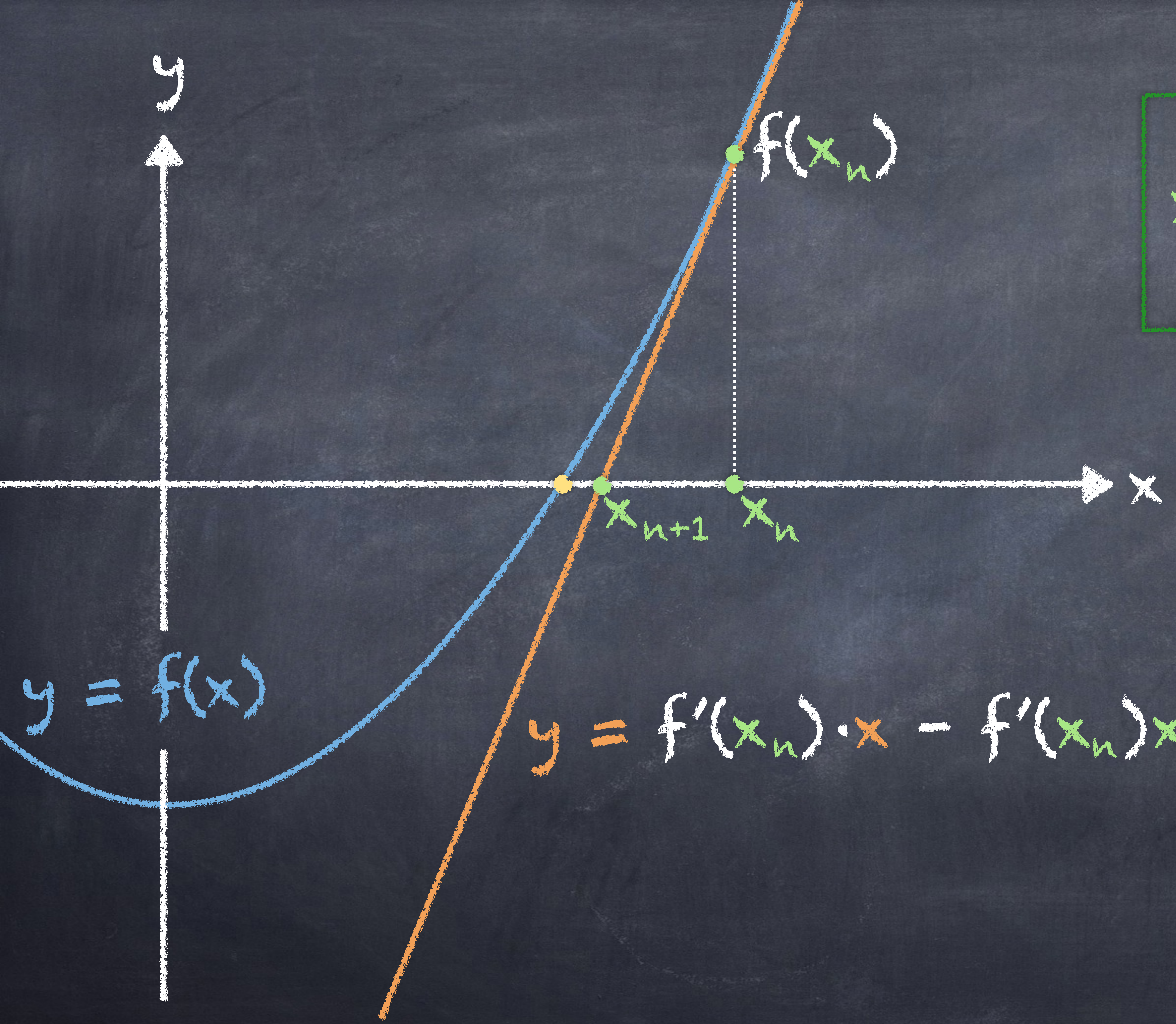
$$f'(x) = 2x$$


y
x
x_n
y = f(x)


y
f(x_n)
x
x_{n+1}
x_n
y = f(x)


y
x
f(x_n)
x_{n+1}
x_n
y = f(x)
y = f′(x_n)·x + const


y
x
$f(x_n)$
x_{n+1}
x_n
$y = f(x)$
$y = f'(x_n)\cdot x - f'(x_n)x_n + f(x_n)$

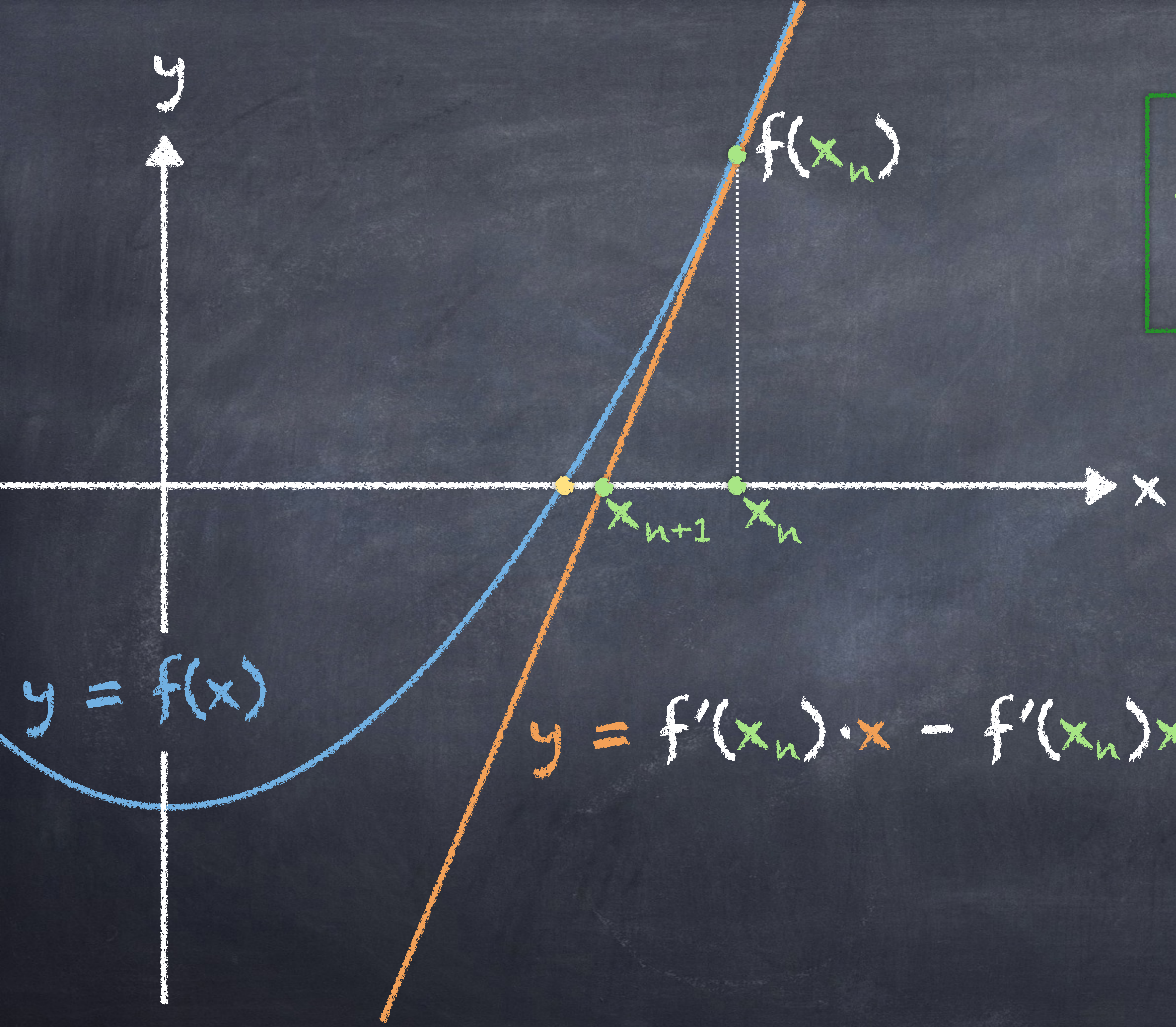


$$y = f'(x_n)\cdot x - f'(x_n)x_n + f(x_n)$$

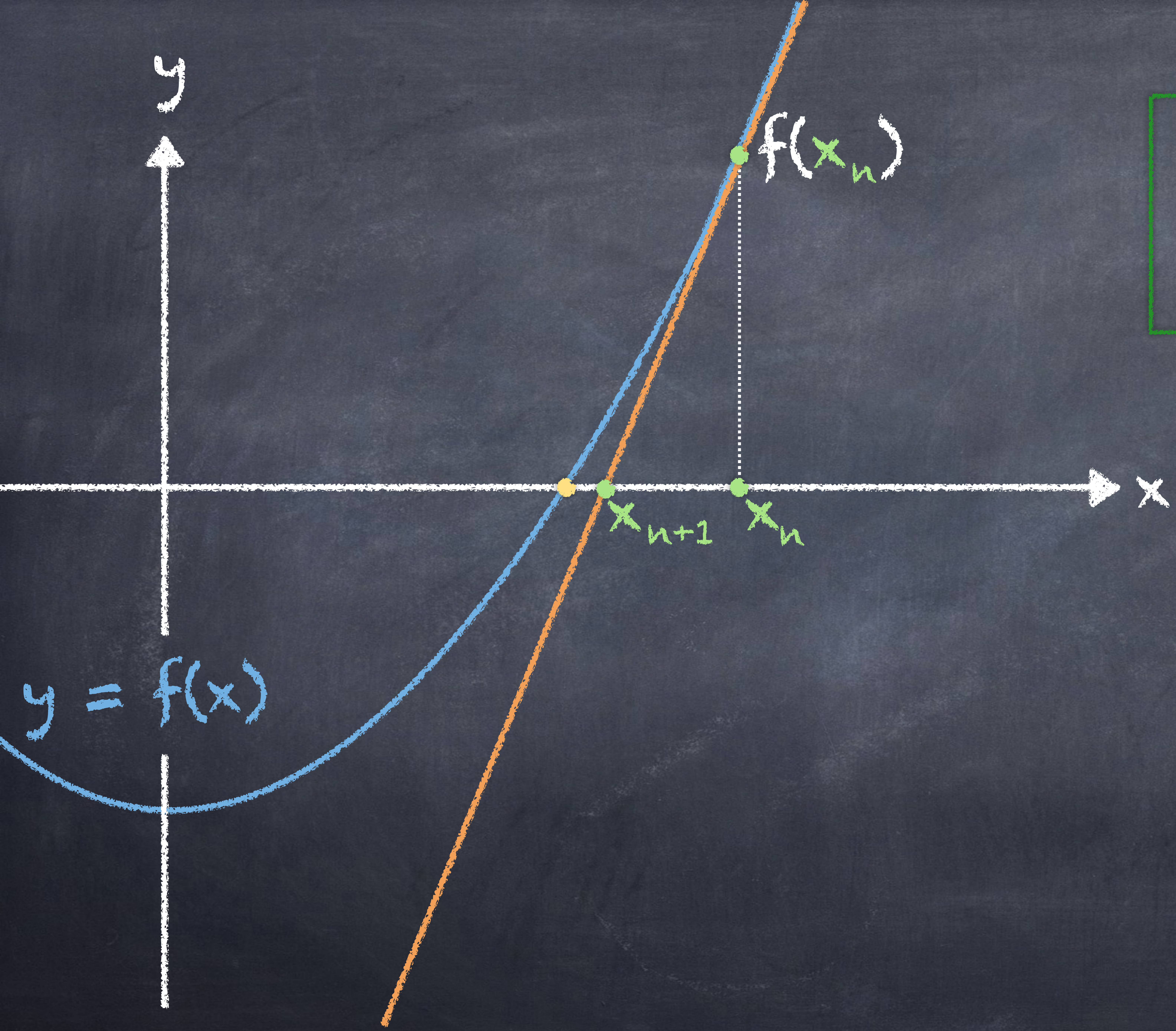
$$\boxed{x_{n+1} = \frac{f'(x_n)x_n - f(x_n)}{f'(x_n)}}$$

Newton's Funktion

$$x_{n+1} = \frac{f'(x_n)x_n - f(x_n)}{f'(x_n)}$$



$$y = f'(x_n) \cdot x - f'(x_n)x_n + f(x_n)$$

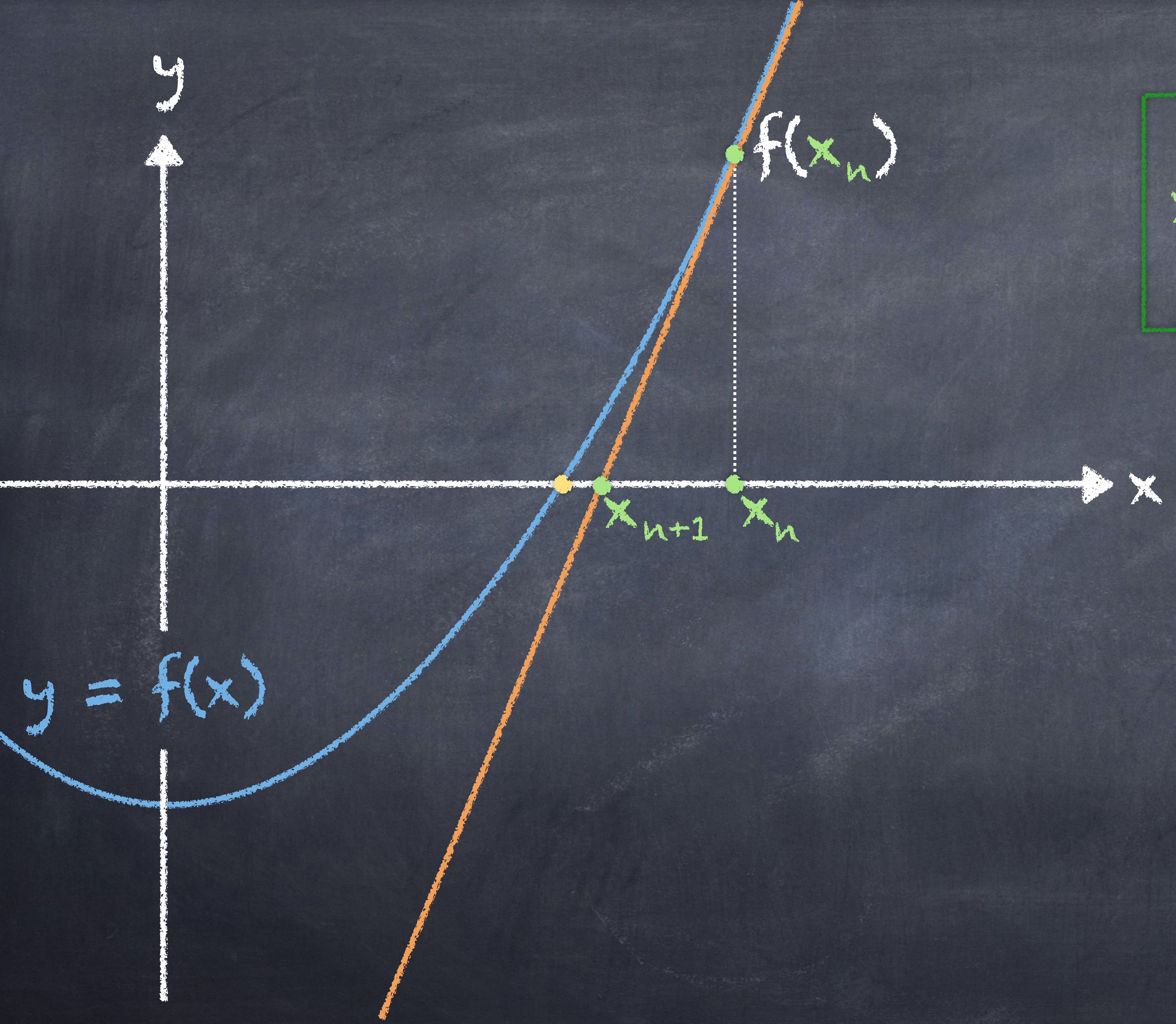


Newton's Funktion

$$\boxed{x_{n+1} = \frac{f'(x_n)x_n - f(x_n)}{f'(x_n)}}$$

$$f(x) = x^2 - 13$$

$$f'(x) = 2x$$

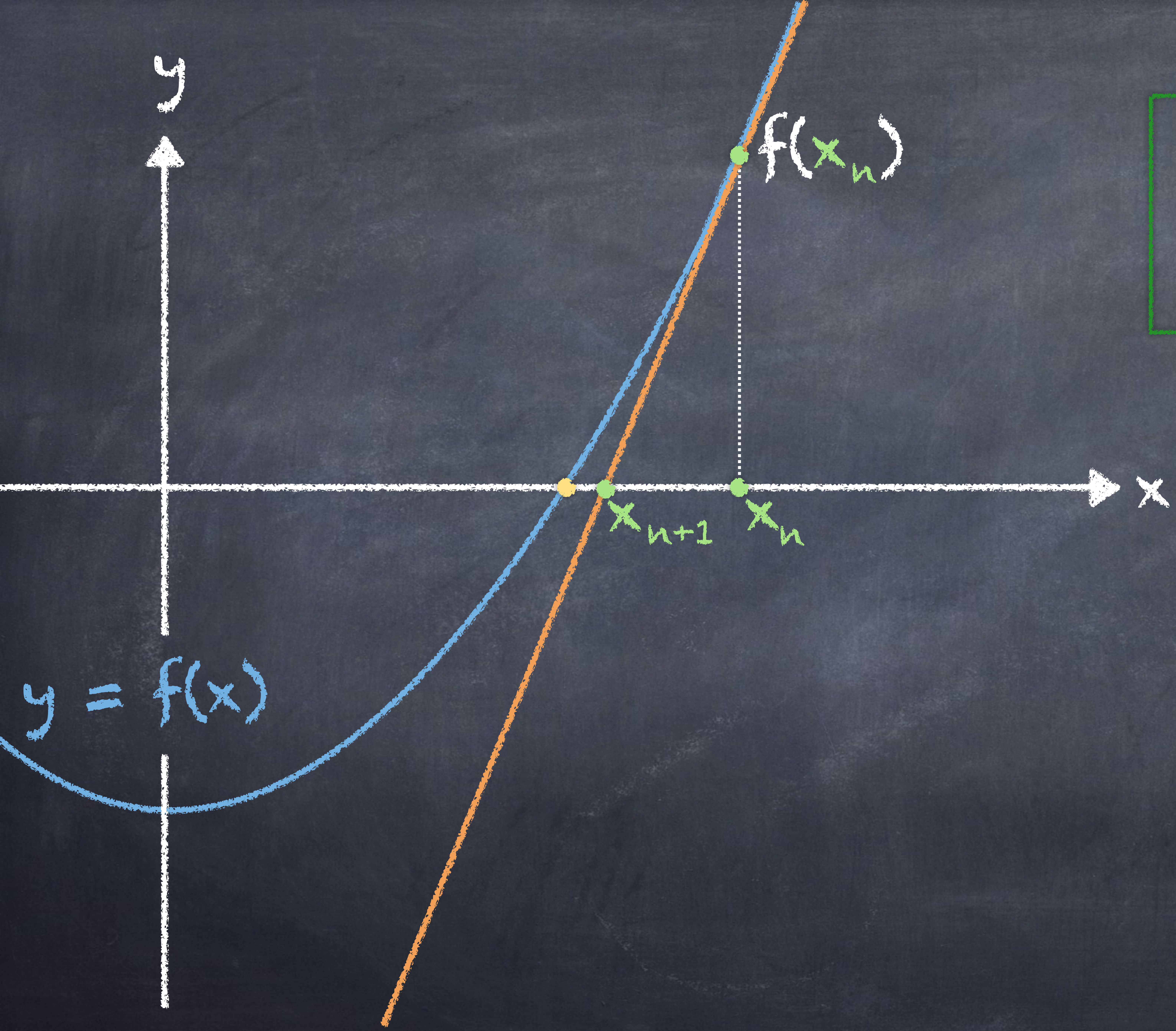


Newton's Funktion

$$\boxed{x_{n+1} = \frac{2x_n^2 - x_n^2 + 13}{2x_n}}$$

$$f(x) = x^2 - 13$$

$$f'(x) = 2x$$

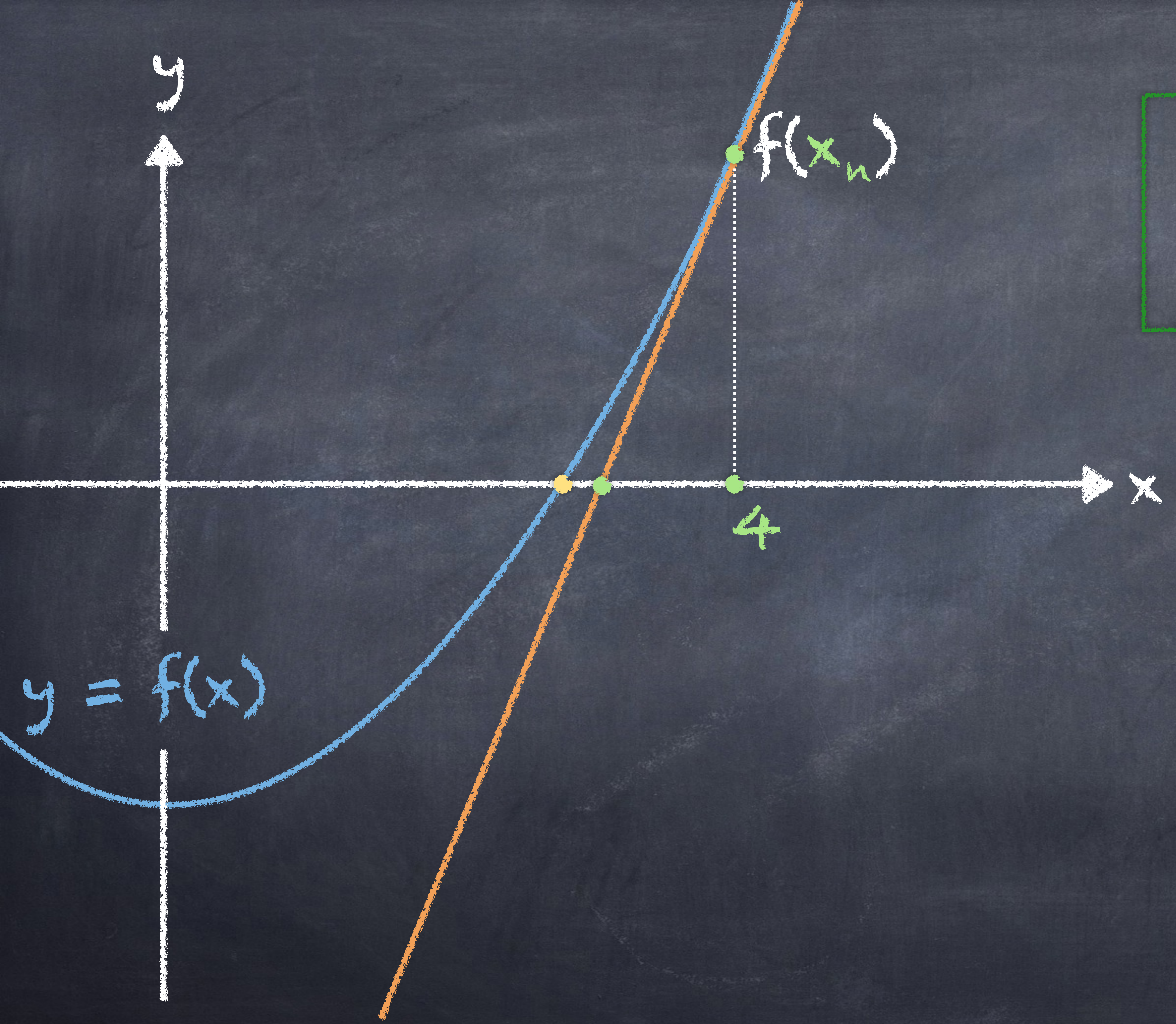


Newton's Funktion

$$\boxed{x_{n+1} = \frac{x_n^2 + 13}{2x_n}}$$

$$f(x) = x^2 - 13$$

$$f'(x) = 2x$$



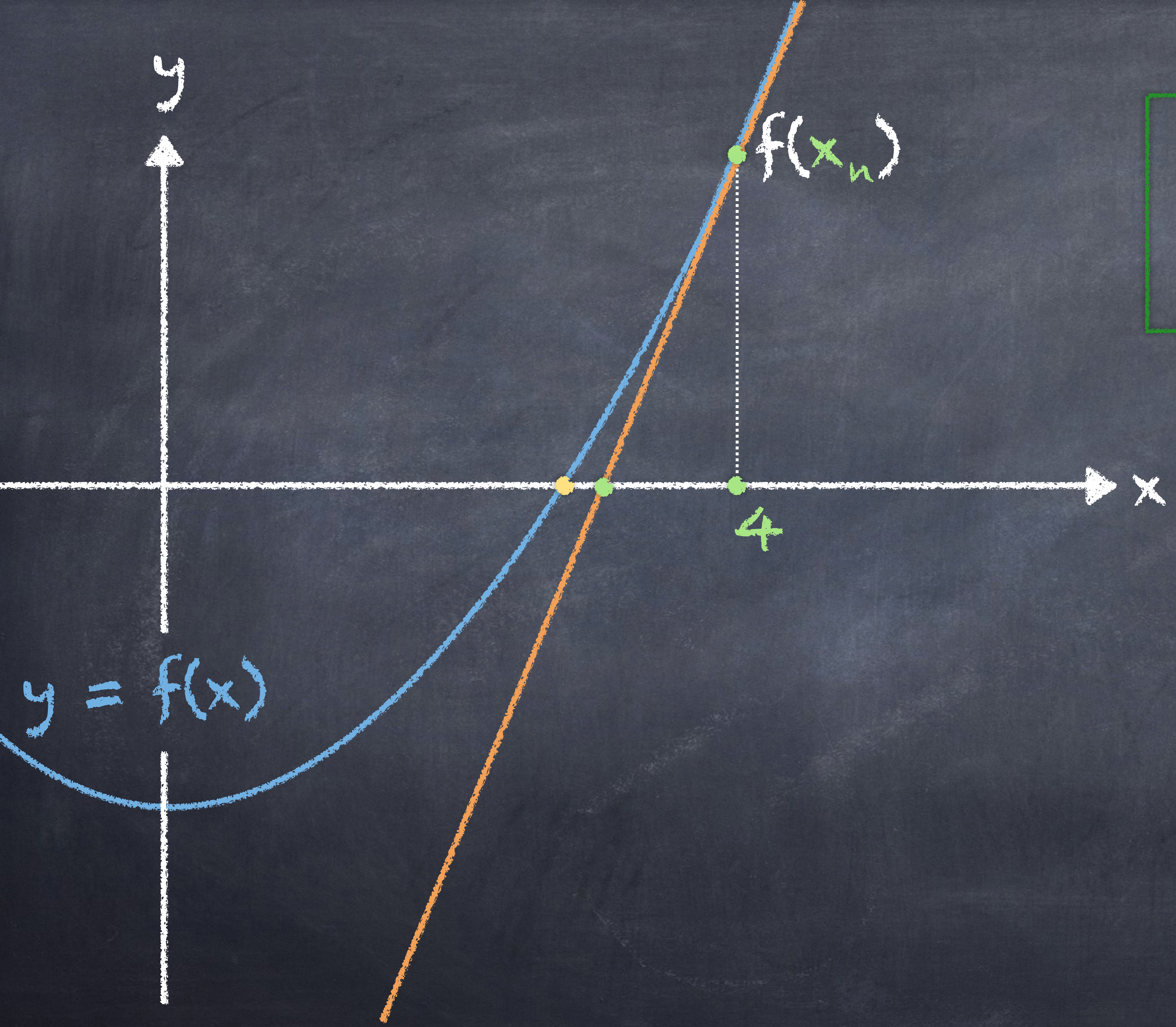
Newton's Funktion

$$\boxed{x_{n+1} = \frac{x_n^2 + 13}{2x_n}}$$

$$f(x) = x^2 - 13$$

$$f'(x) = 2x$$

$$x_0 = 4$$



Newton's Funktion

$$\boxed{x_{n+1} = \frac{x_n^2+13}{2x_n}}$$

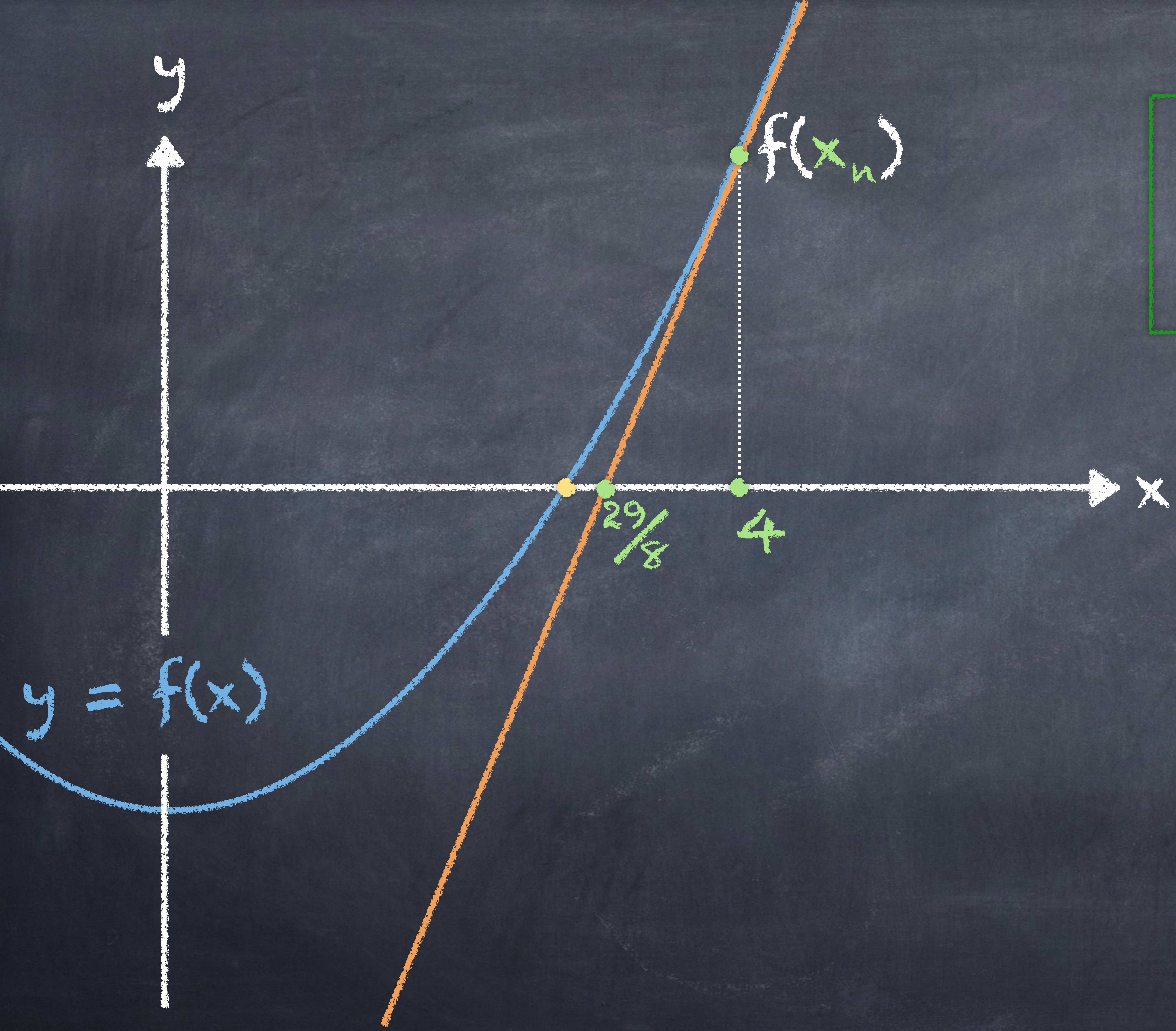
$$f(x) = x^2 - 13$$

$$f'(x) = 2x$$

$$x_0 = 4$$

$$x_1 = \frac{4^2+13}{2\cdot 4}$$

Newton's Funktion



$$\boxed{x_{n+1} = \frac{x_n^2+13}{2x_n}}$$

$$f(x) = x^2-13$$

$$f'(x) = 2x$$

$$x_0 = 4$$

$$x_1 = \frac{4^2+13}{2\cdot 4} = 29/8$$

n	x_n
0	4
1	29/8
2	
3	
4	
5	

n	x_n
0	4
1	29/8
2	
3	
4	
5	

$$x_2 = \frac{\left(\frac{29}{8}\right)^2 + 13}{2 \cdot \frac{29}{8}}$$

n	x_n
0	4
1	29/8
2	
3	
4	
5	

$$x_2 = \frac{\left(\frac{29}{8}\right)^2 + 13}{2 \cdot \frac{29}{8}} = 1673/464$$

n	x_n
0	4
1	29/8
2	1673/464
3	
4	
5	

$$x_2 = \frac{\left(\frac{29}{8}\right)^2 + 13}{2 \cdot \frac{29}{8}} = 1673/464$$

n	x_n
0	4
1	29/8
2	1673/464
3	
4	
5	

n	x_n
0	4
1	29/8
2	1673/464
3	$\frac{5\,597777}{1\,552544}$
4	
5	

n	x_n
0	4
1	29/8
2	1673/464
3	$\frac{5\,597777}{1\,552544}$
4	$\frac{62\,670214\,676897}{17\,381590\,189376}$
5	

n	x_n
0	4
1	29/8
2	1673/464
3	$\dfrac{5\ 597777}{1\ 552544}$
4	$\dfrac{62\ 670214\ 676897}{17\ 381590\ 189376}$
5	$\dfrac{7855\ 111615\ \ 296712\ 300168\ \ 050497}{2178\ 615977\ 188081\ 401764\ 092544}$

n	x_n
0	4
1	$29/8$
2	$1673/464$
3	$\dfrac{5\ 597777}{1\ 552544}$
4	$\dfrac{62\ 670214\ 676897}{17\ 381590\ 189376}$
5	$\dfrac{7855\ 111615\ 296712\ 300168\ 050497}{2178\ 615977\ 188081\ 401764\ 092544}$

$$x_5 = 3.60555127546398929311922126747049594625135071370 30\ldots$$

n	x_n
0	4
1	29/8
2	1673/464
3	$\dfrac{5\ 597777}{1\ 552544}$
4	$\dfrac{62\ 670214\ 676897}{17\ 381590\ 189376}$
5	$\dfrac{7855\ 111615\ 296712\ 300168\ 050497}{2178\ 615977\ 188081\ 401764\ 092544}$

$$\sqrt{13} = 3.605551275463989293119221267470495946251296573845 2\ldots$$

$$x_5 = 3.60555127546398929311922126747049594625135071370 30\ldots$$

n	x_n
0	4
1	$29/8$
2	$1673/464$
3	$\dfrac{5\ 597777}{1\ 552544}$
4	$\dfrac{62\ 670214\ 676897}{17\ 381590\ 189376}$
5	$\dfrac{7855\ 111615\ 296712\ 300168\ 050497}{2178\ 615977\ 188081\ 401764\ 092544}$

$$\sqrt{13} = \boxed{3.605551275463989293119221267470495946251}\ 2965738452\ldots$$

$$x_5 = \boxed{3.605551275463989293119221267470495946251}\ 3507137030\ldots$$

40

n	x_n
0	4
1	3.6
2	3.6056034482758620689655172413793103448275862068966...
3	3.605551275
4	3.6055512754639892931
5	3.605551275463989293119221267470495946251

$$\sqrt{13} = \boxed{3.605551275463989293119221267470495946251}\ 2965738452\ldots$$

$$x_5 = \boxed{3.605551275463989293119221267470495946251}\ 3507137030\ldots$$

40

Das Newton-Verfahren zum Lösen der Gleichung $f(x)=0$

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4. Jetzt sollte x_5 (oder x_{10}, oder x_{100}) eine sehr gute Näherungslösung von $f(x) = 0$ sein.

Das Newton-Verfahren
zum Lösen der Gleichung $f(x)=0$

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4. Jetzt **sollte** x_5 (oder x_{10}, oder x_{100}) eine sehr gute Näherungslösung von $f(x) = 0$ sein.

$$x^2 + 8x + 3 = 0$$

$$x^8 + x^5 - 7x^3 + 7 = 0$$

$$f(x) = x^8 + x^5 - 7x^3 + 7$$

$$f(x) = x^8 + x^5 - 7x^3 + 7$$
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$x_0 = ???$

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$x_0 = 1$??

n	x_n
0	1
1	1.25
2	
3	
4	
5	
6	
7	
8	

n	x_n
0	1
1	1.25
2	1.116582289491997216423103688 24...
3	
4	
5	
6	
7	
8	

n	x_n
0	1
1	1.25
2	1.116582289491997216423103688 24…
3	2.397156794089030590853928885981…
4	
5	
6	
7	
8	

n	x_n
0	1
1	1.25
2	1.116582289491997216423103688824...
3	2.397156794089030590853928885981...
4	2.103914605703370159915482720 10...
5	
6	
7	
8	

n	x_n
0	1
1	1.25
2	1.11658228949199721642310368824...
3	2.39715679408903059085392885981...
4	2.10391460570337015991548272010...
5	1.85340845090572551199521178016...
6	
7	
8	

n	x_n
0	1
1	1.25
2	1.11658228949199721642310368824...
3	2.39715679408903059085392885981...
4	2.10391460570337015991548272010...
5	1.85340845090572551199521178016...
6	1.64325522064151533089929608550...
7	
8	

n	x_n
0	1
1	1.25
2	1.11658228949199721642310368824...
3	2.39715679408903059085392885981...
4	2.10391460570337015991548272010...
5	1.85340845090572551199521178016...
6	1.64325522064151533089929608550...
7	1.47104283949979937711595709286...
8	

n	x_n
0	1
1	1.25
2	1.116582289491997216423103688824...
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7	1.47104283949979937711595709286...
8	1.33184010154036499449796344191...

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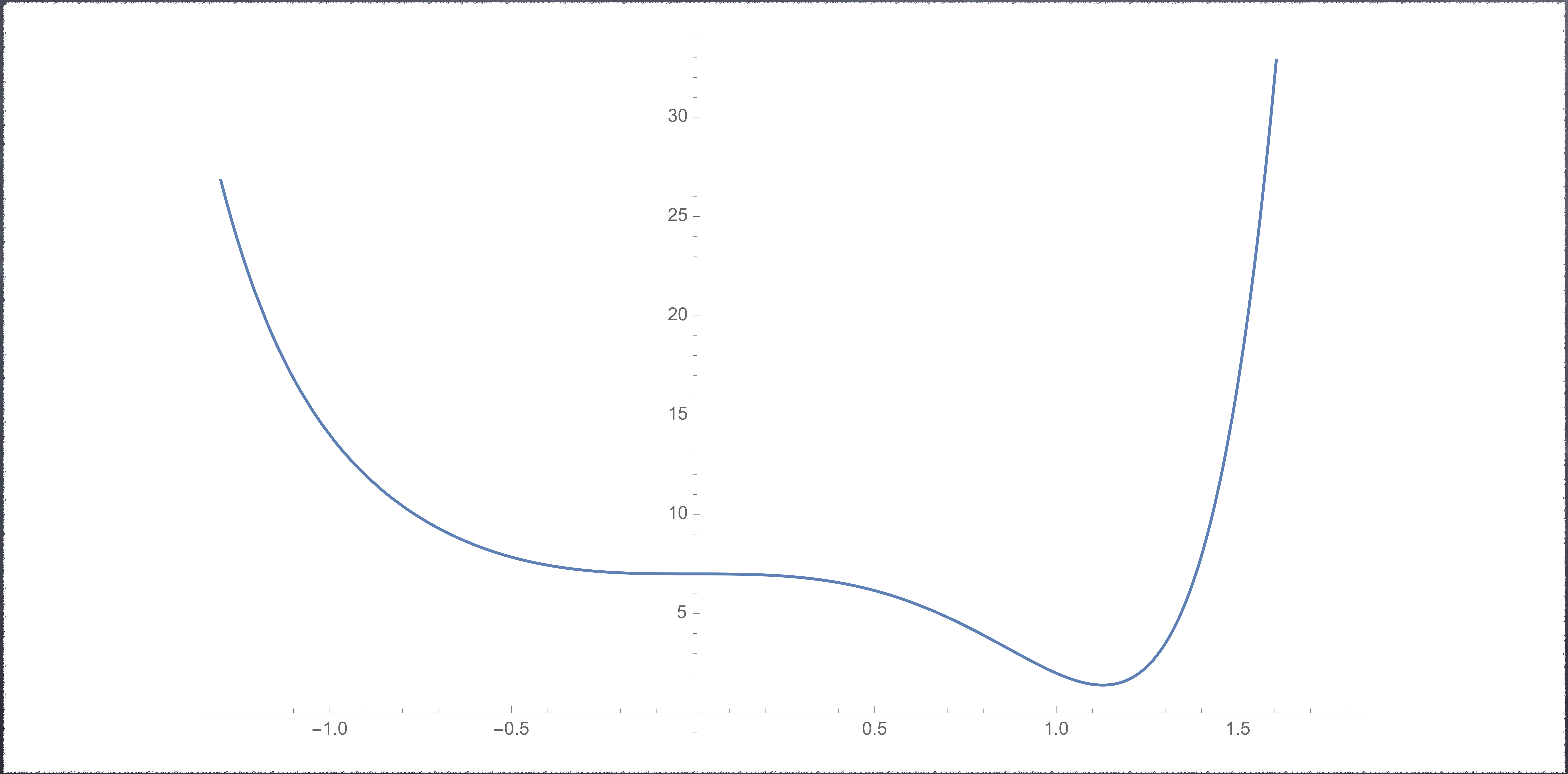
Nahe bei einer Nullstelle von f → $\boxed{x_0 = ???}$

$$f(x) = x^8 + x^5 - 7x^3 + 7$$



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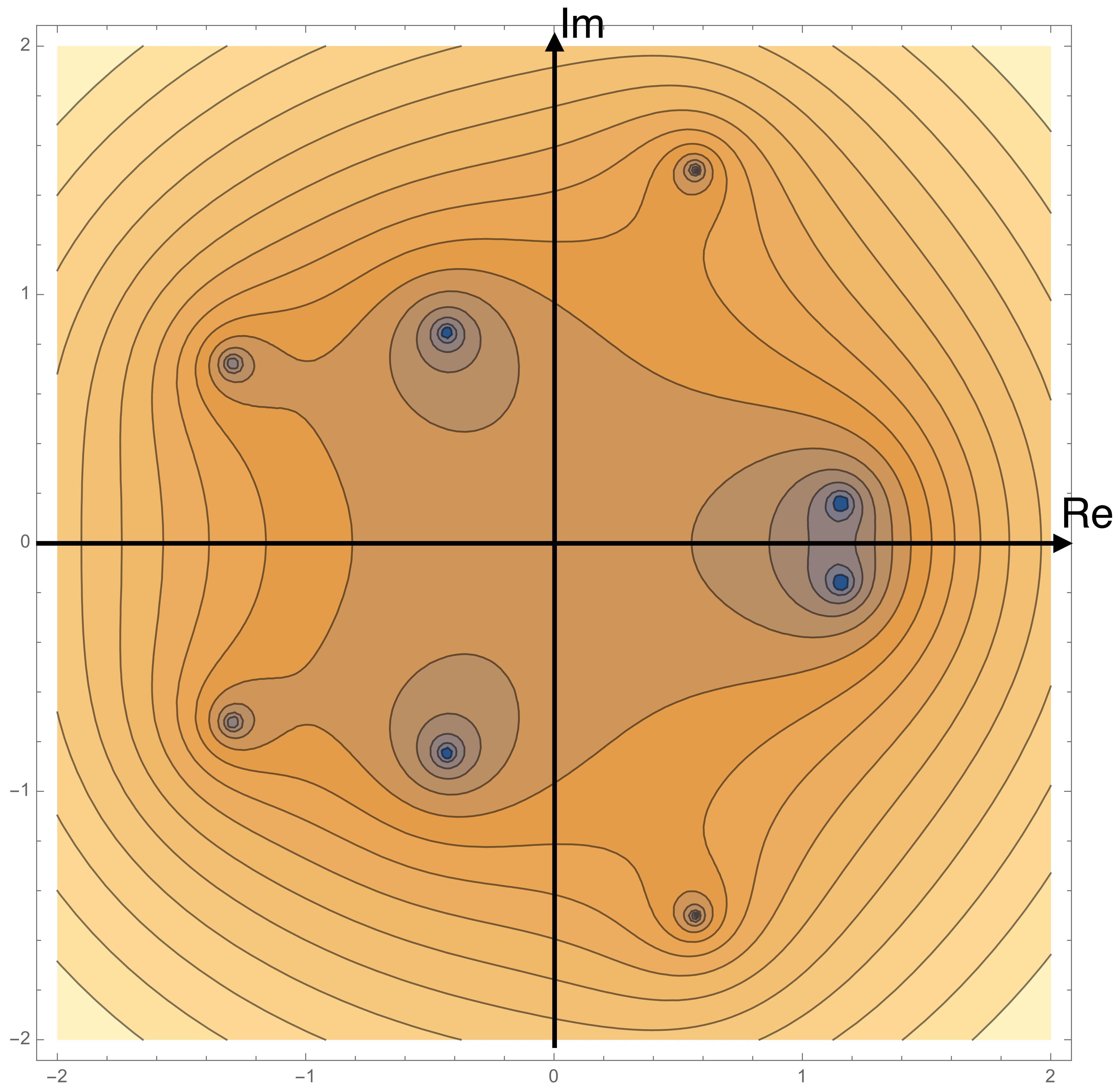

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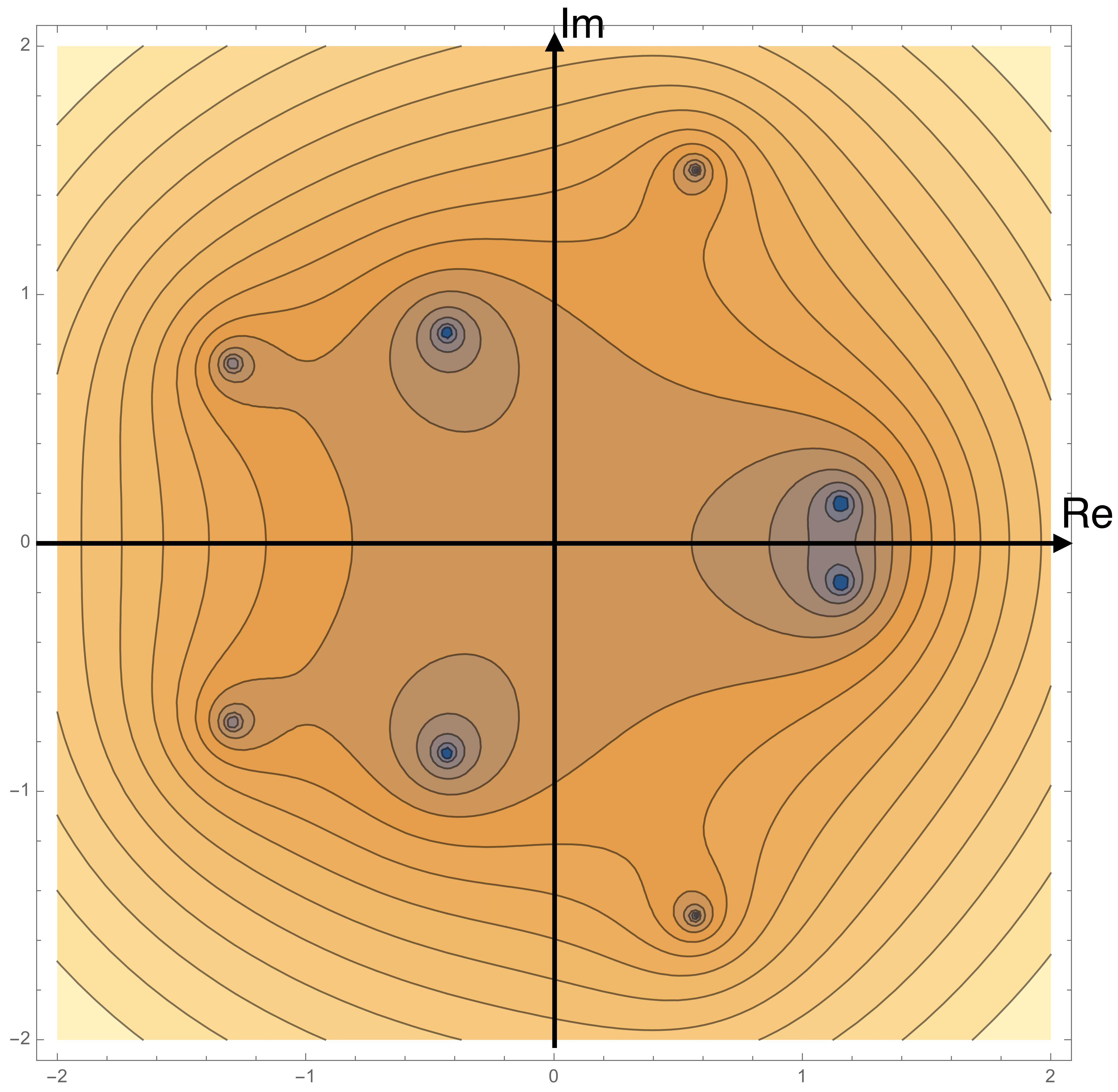

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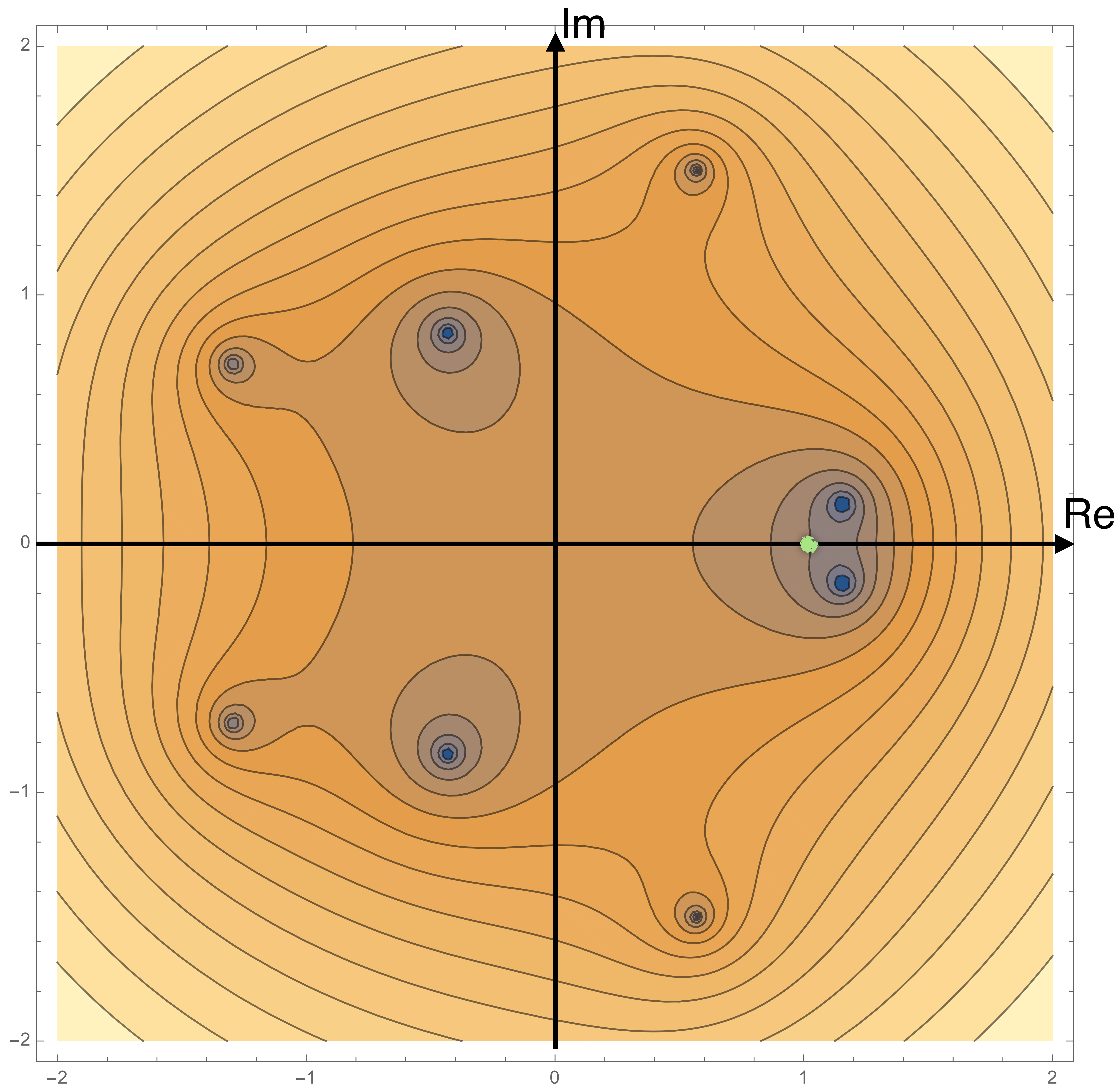
$$x_0 = 1$$



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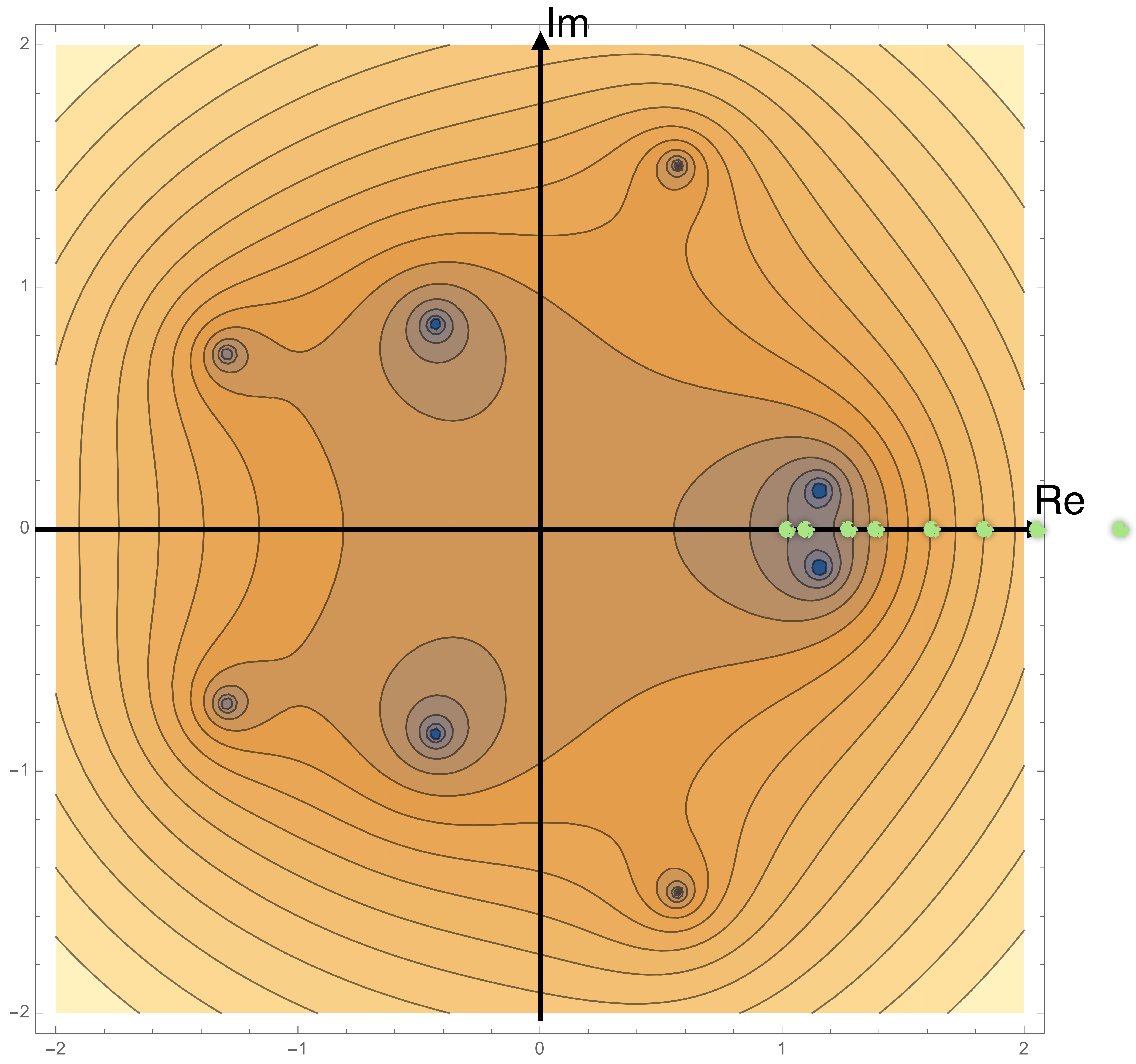

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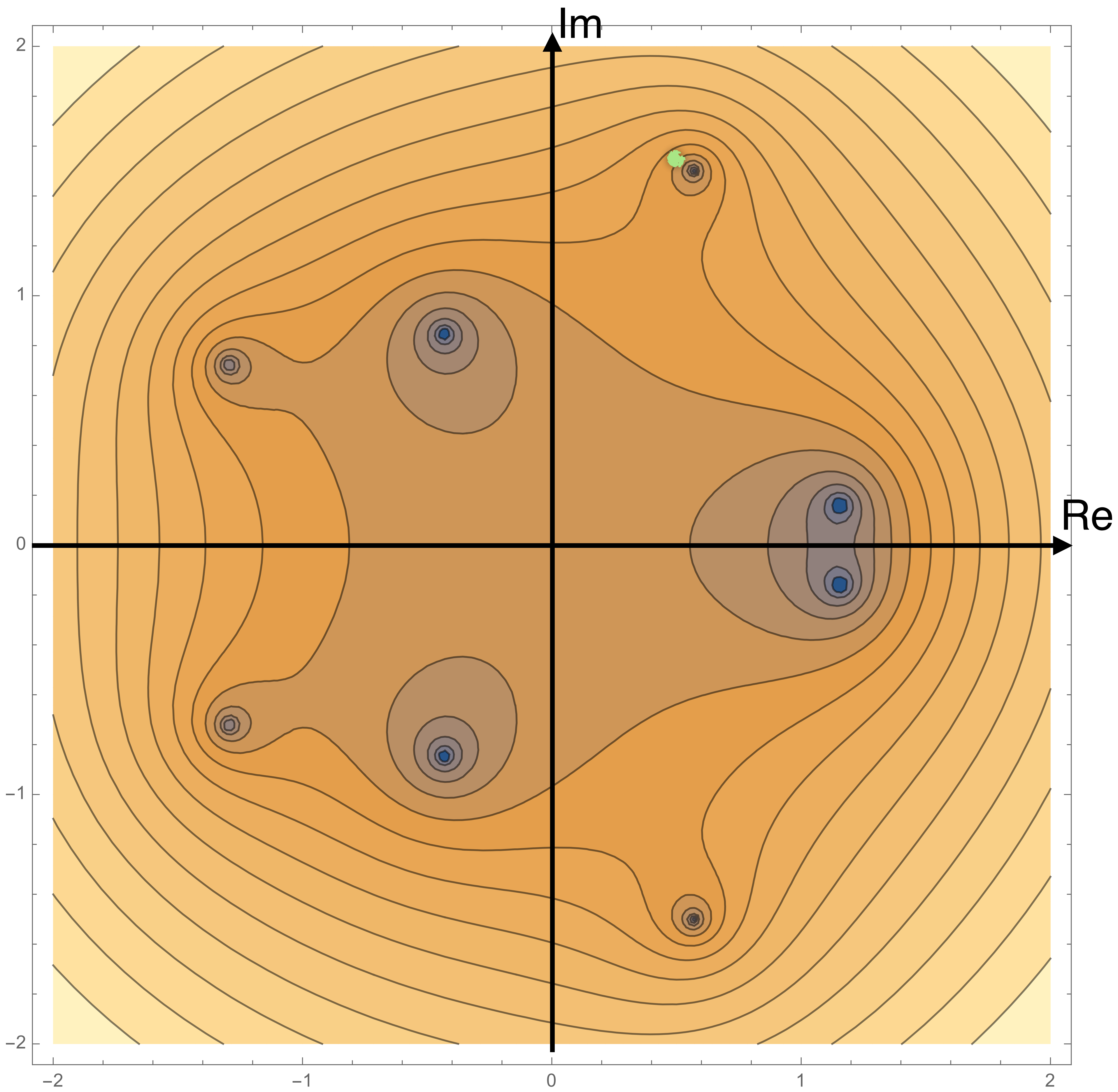
$$x_0 = 0.5 + 1.5i$$



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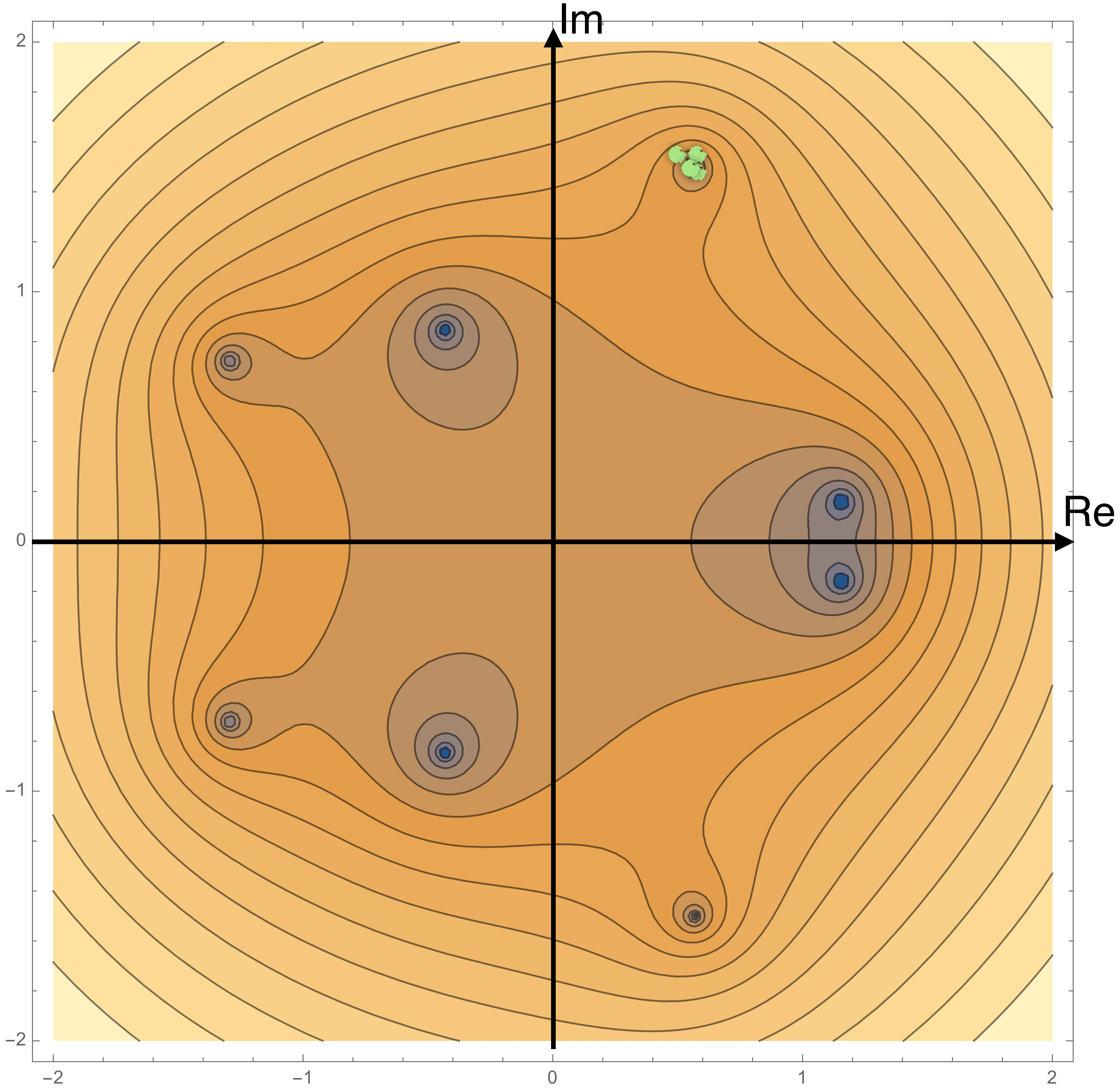

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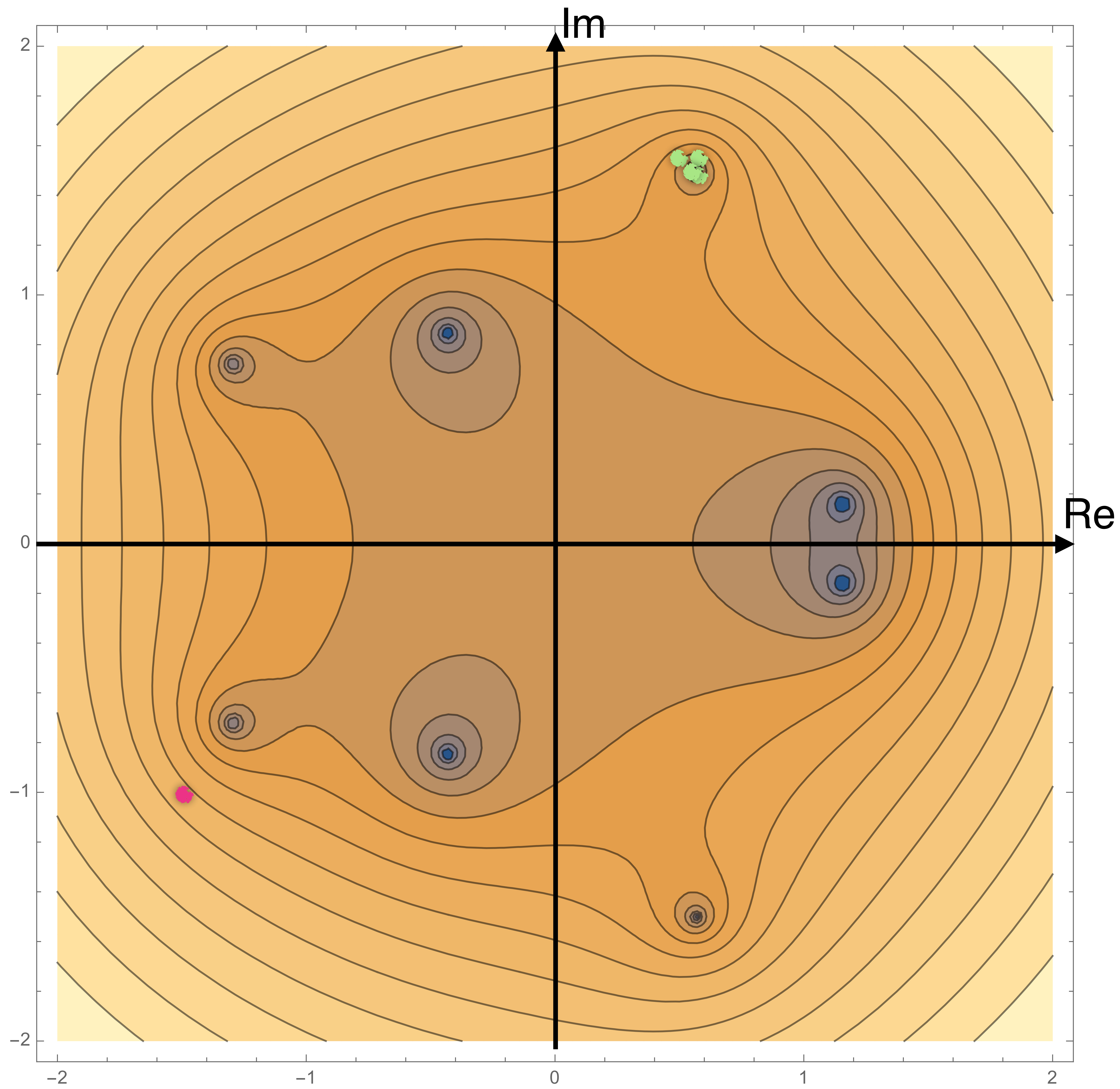

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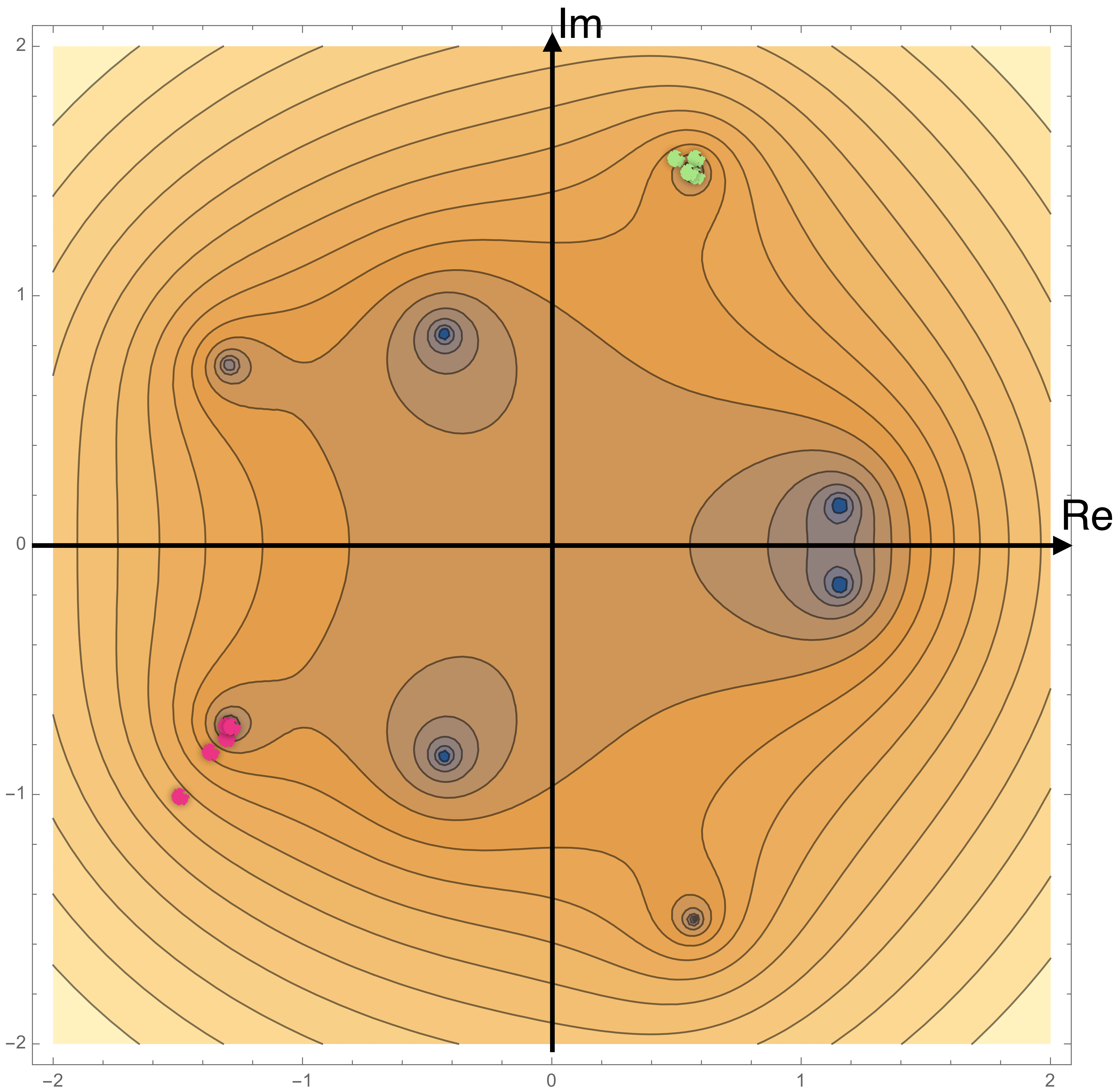

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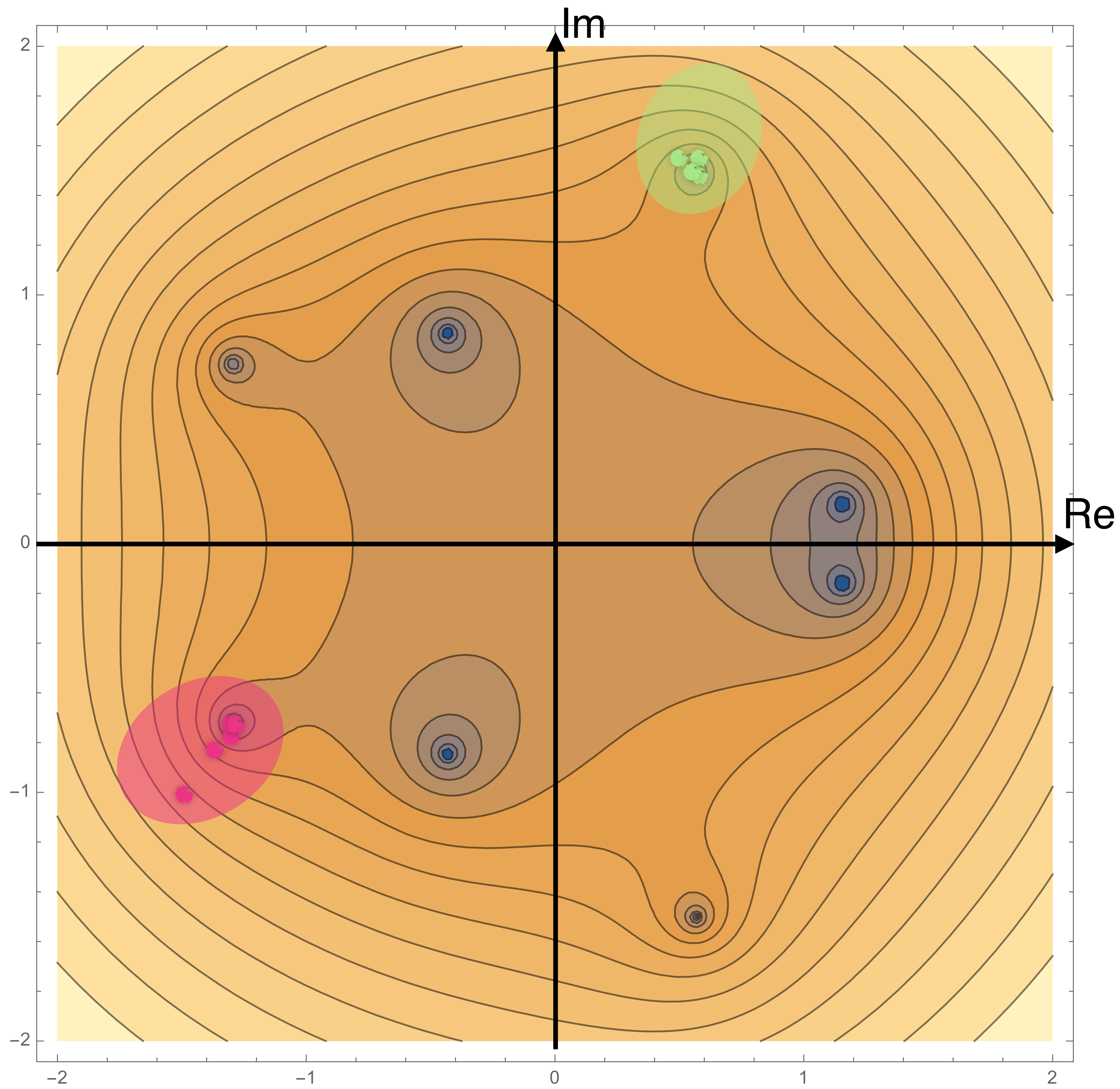

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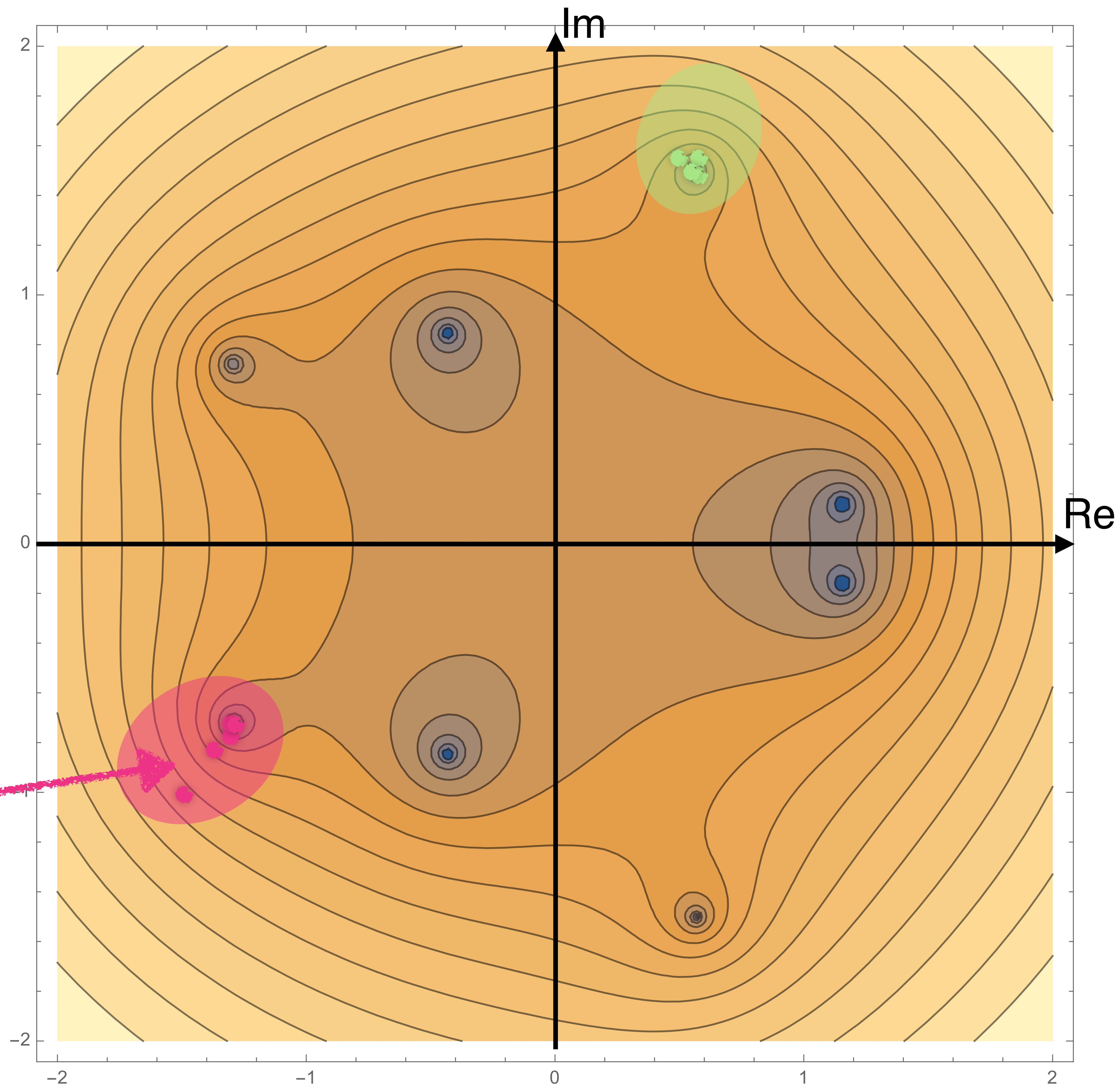
Attraktionsbecken



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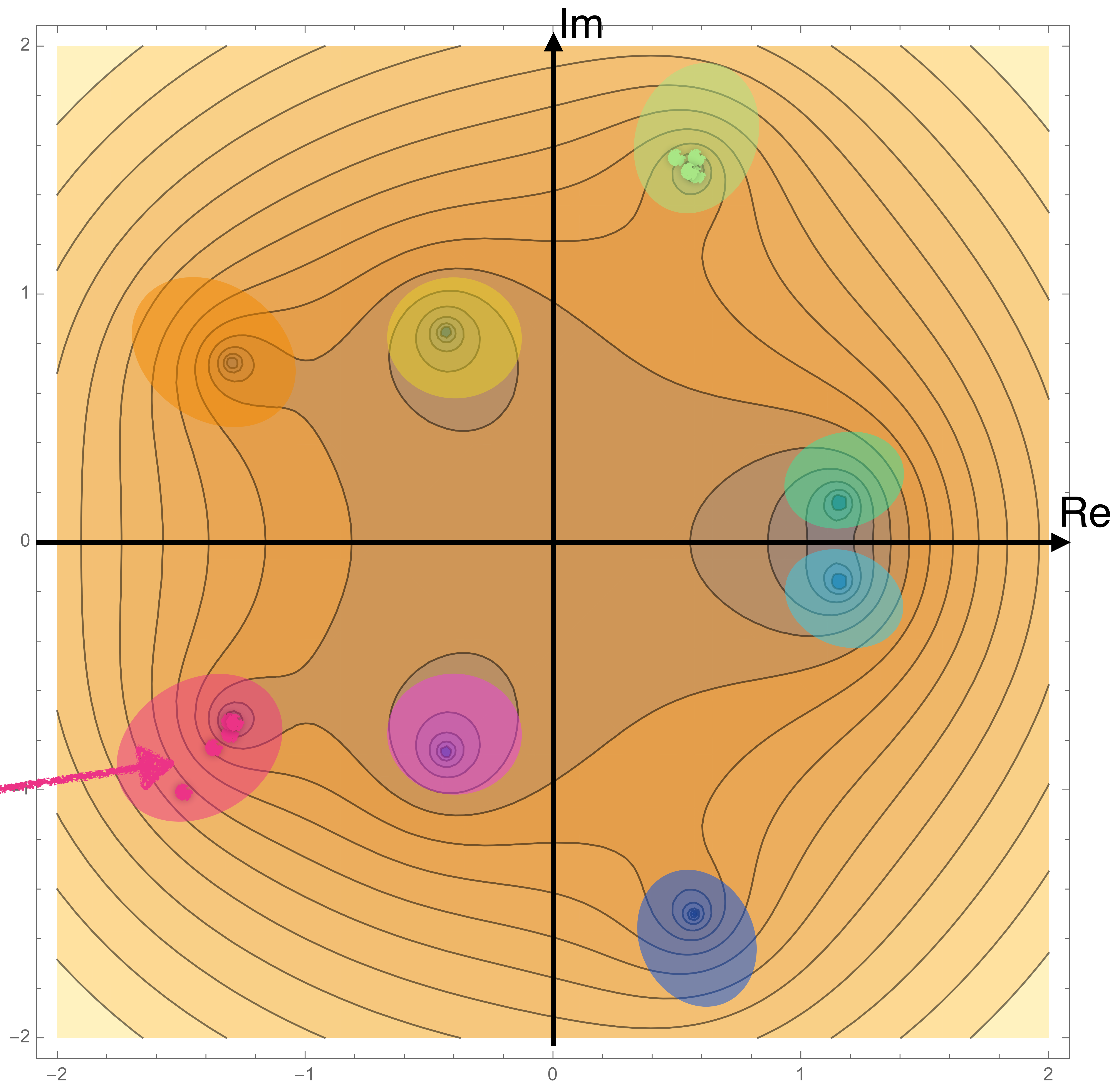

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$x_0 = 0.2 - 0.5i$

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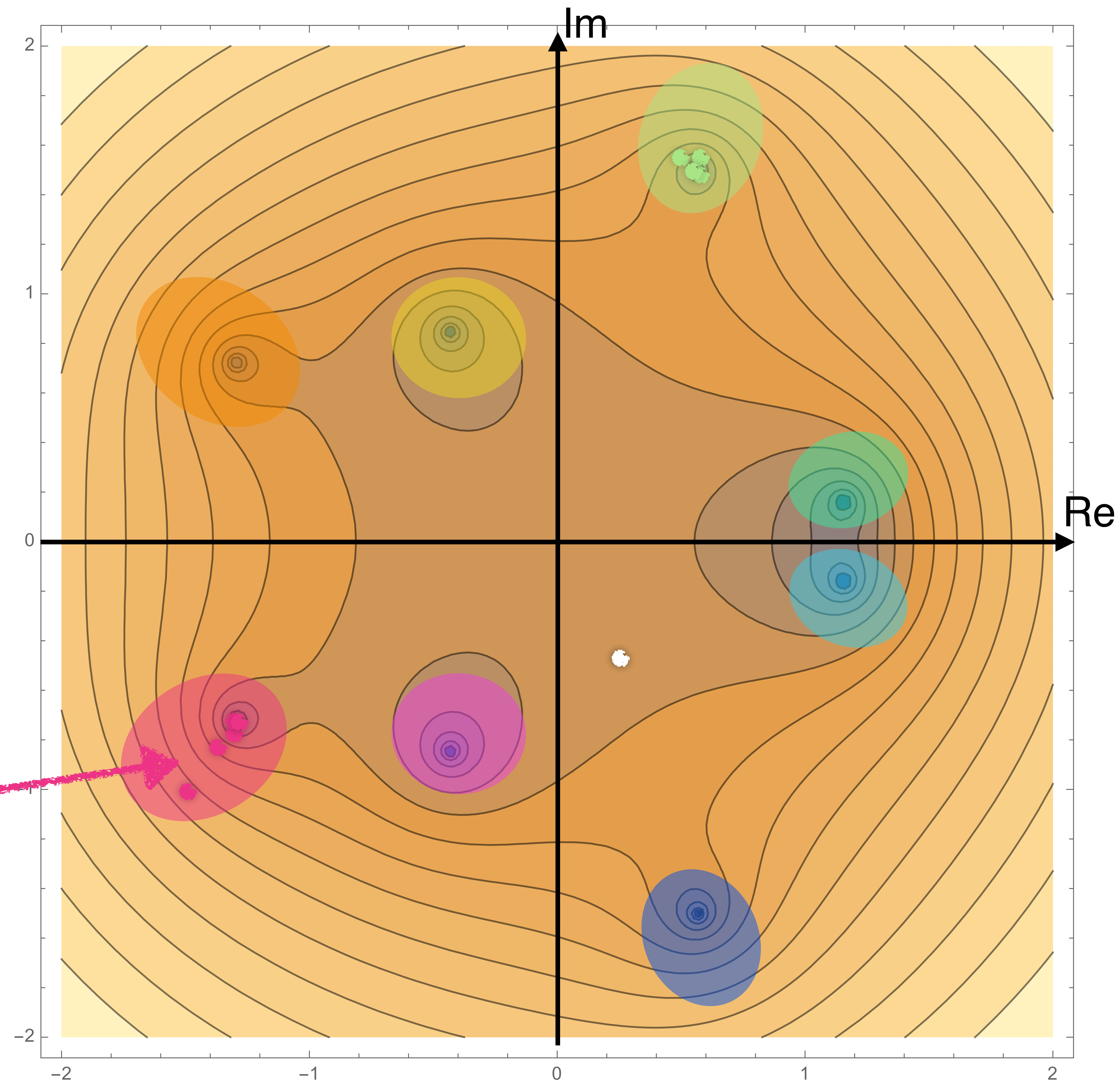

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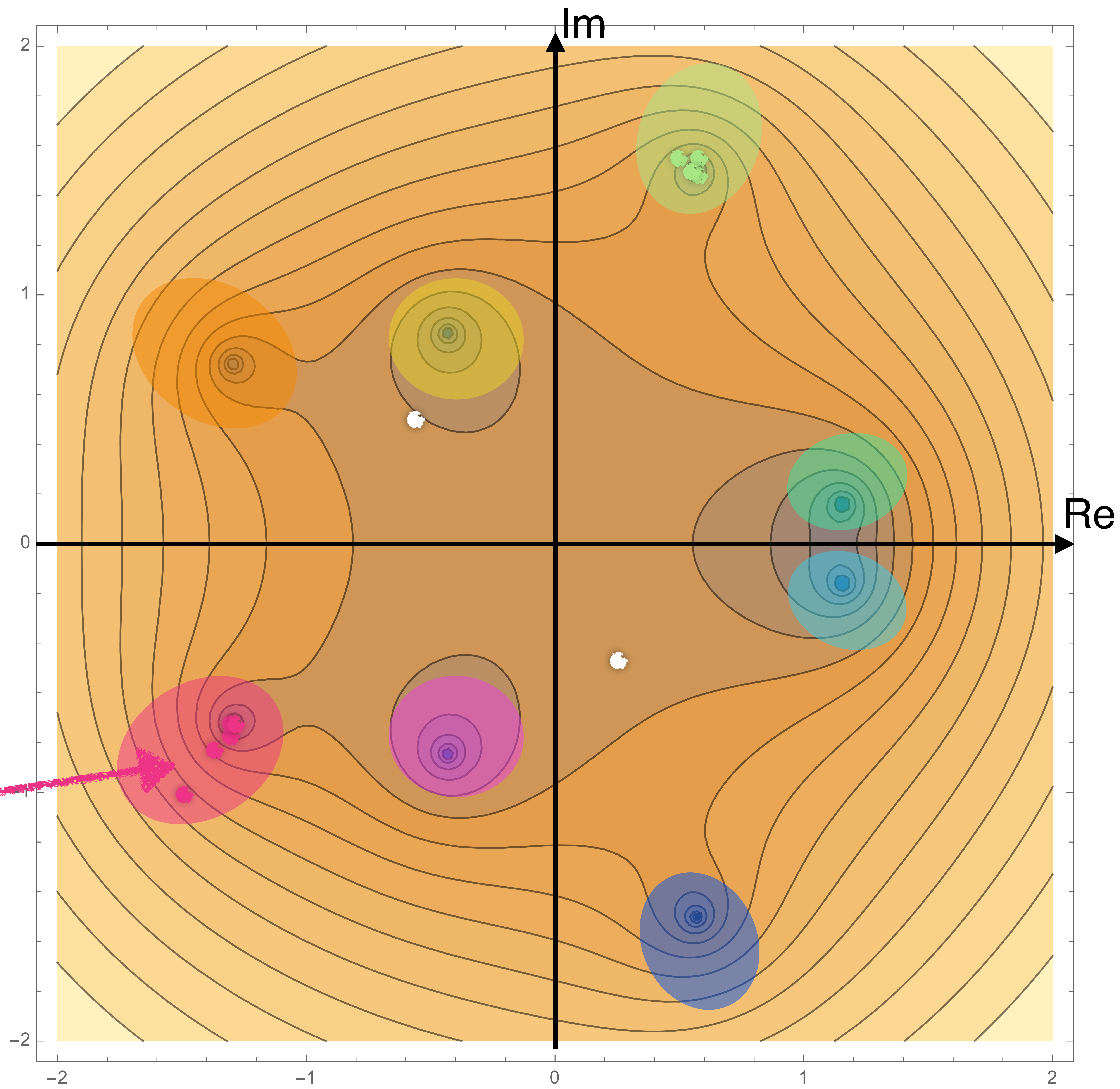
$x_0 = 0.5 + 1.5i$

$x_0 = -1.5 - i$

$x_0 = 0.2 - 0.5i$

$x_1 = -0.6 + 0.4i$

Attraktionsbecken



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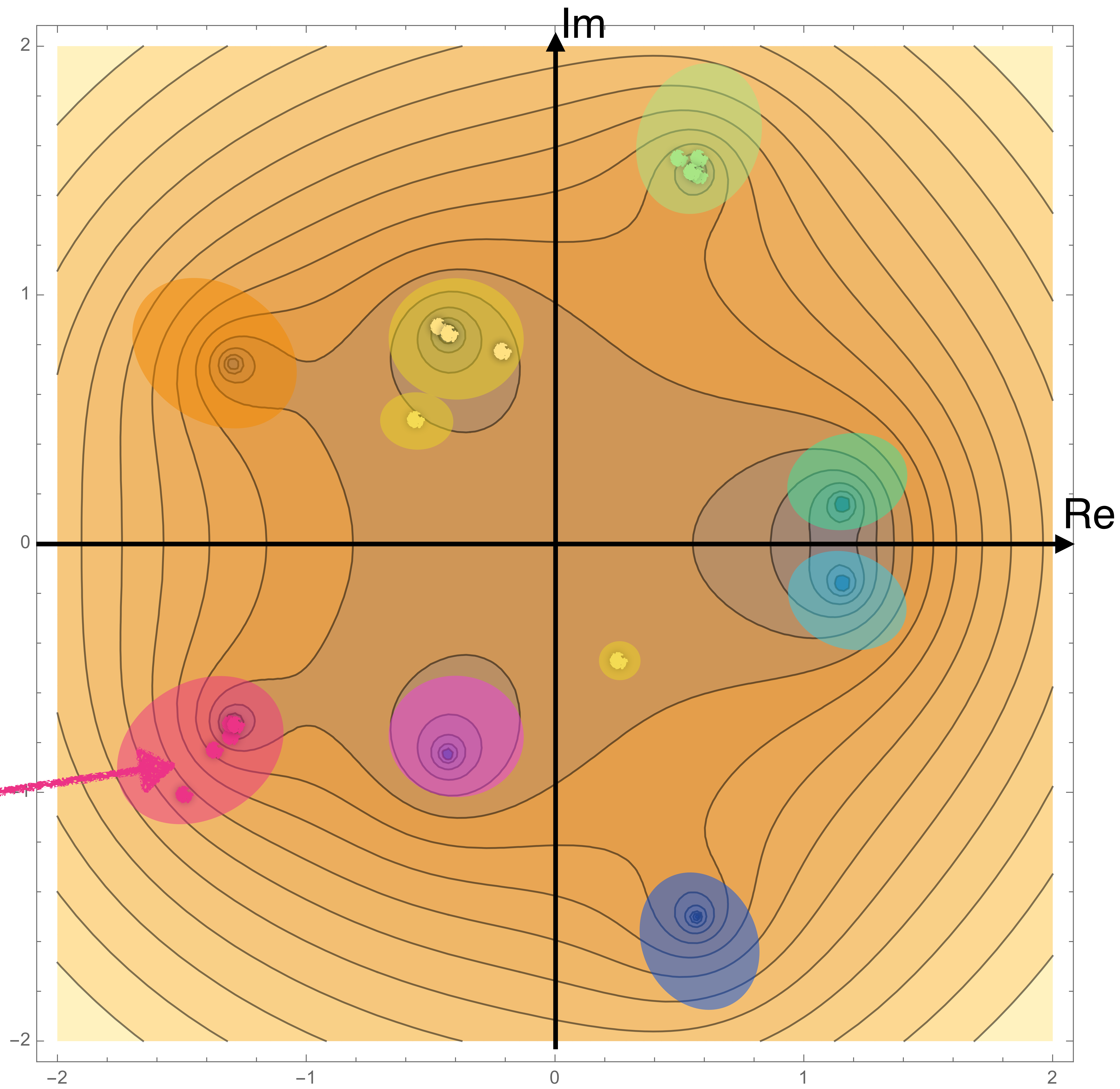
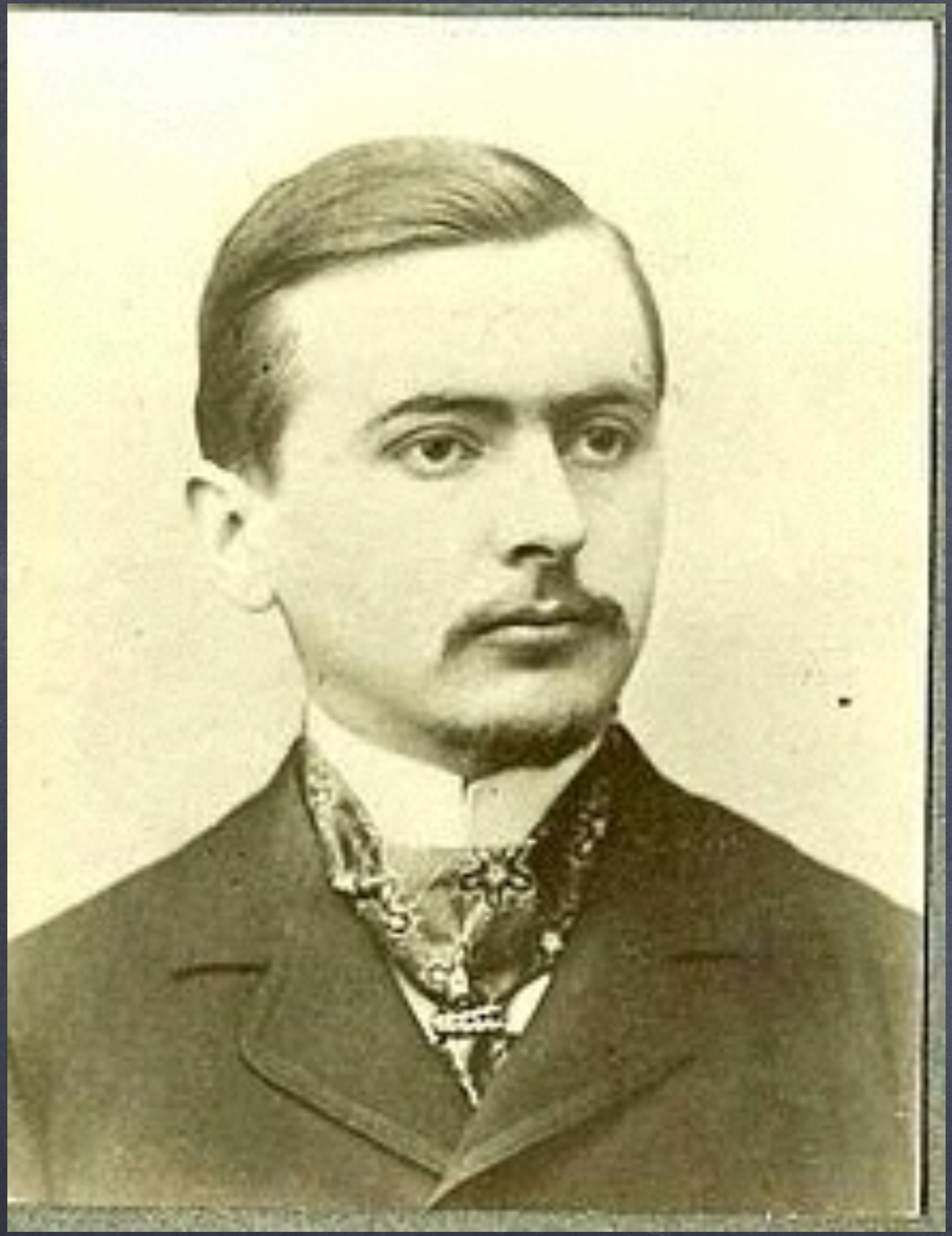
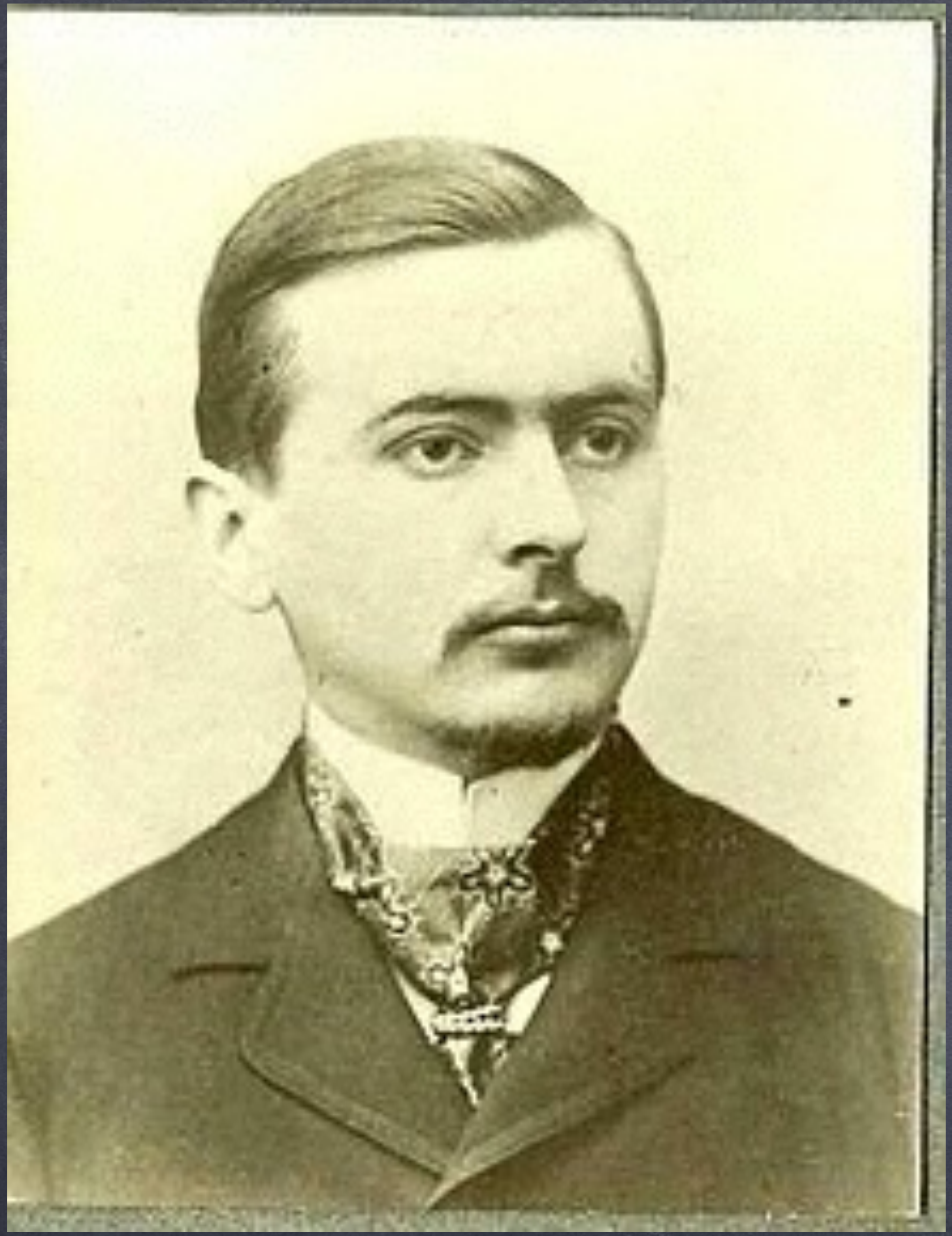
Attraktionsbecken





Pierre Fatou
1878 – 1929

Gaston Julia
1893 – 1978



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$$x_0 = 0{,}5 + 1{,}5i$$

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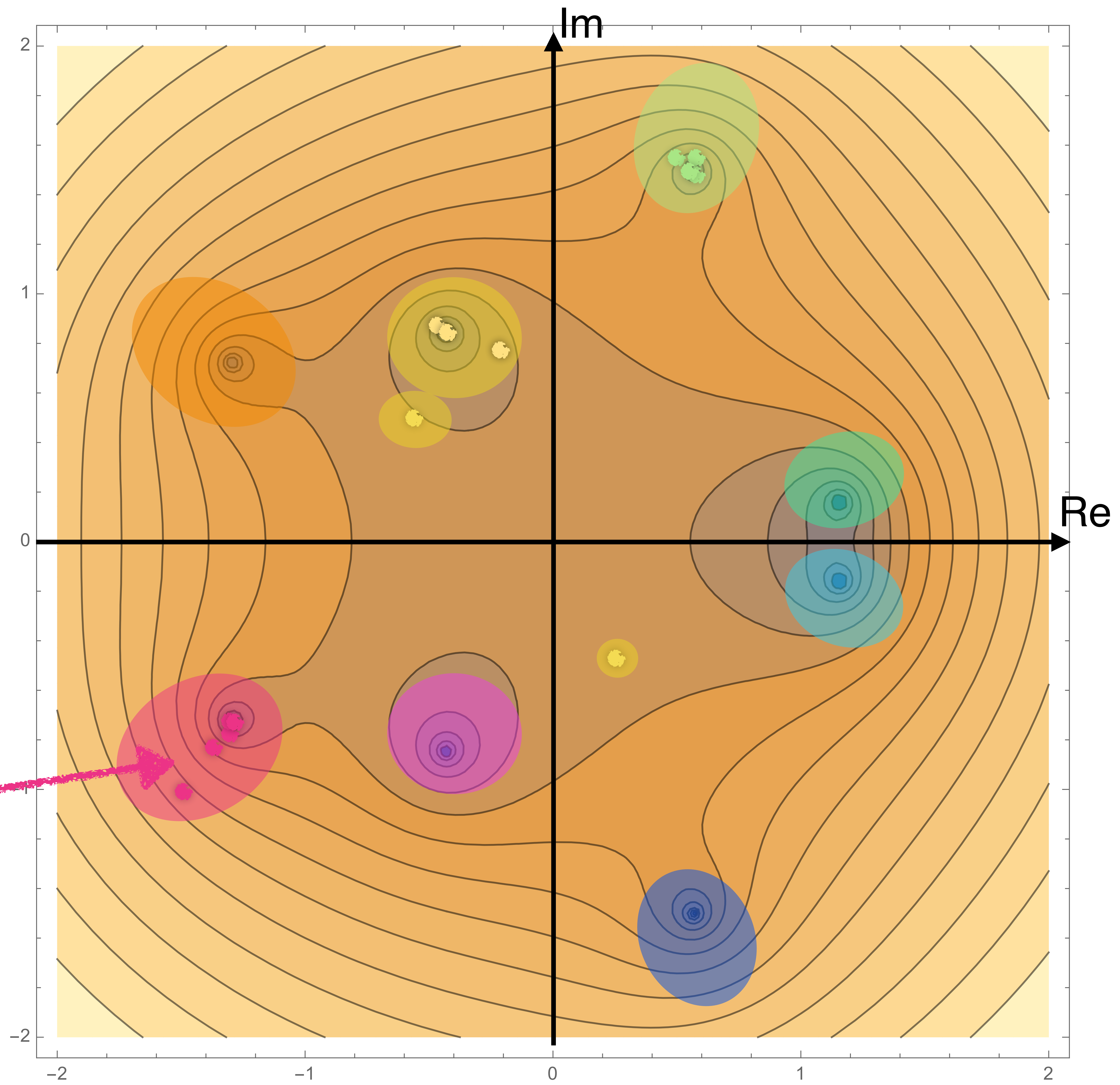
Attraktionsbecken



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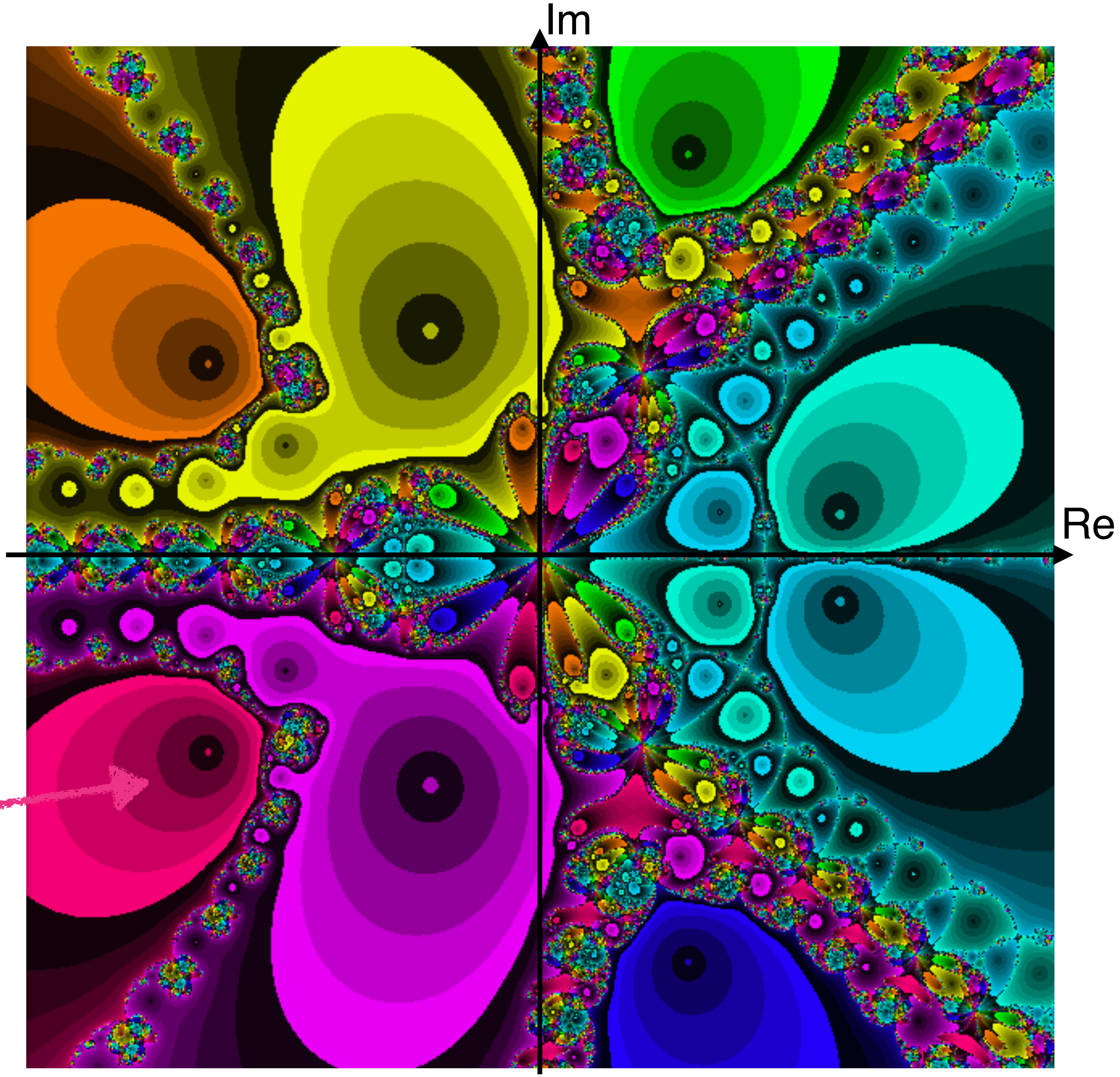
Attraktionsbecken



$f(x) = x^3 + 1$

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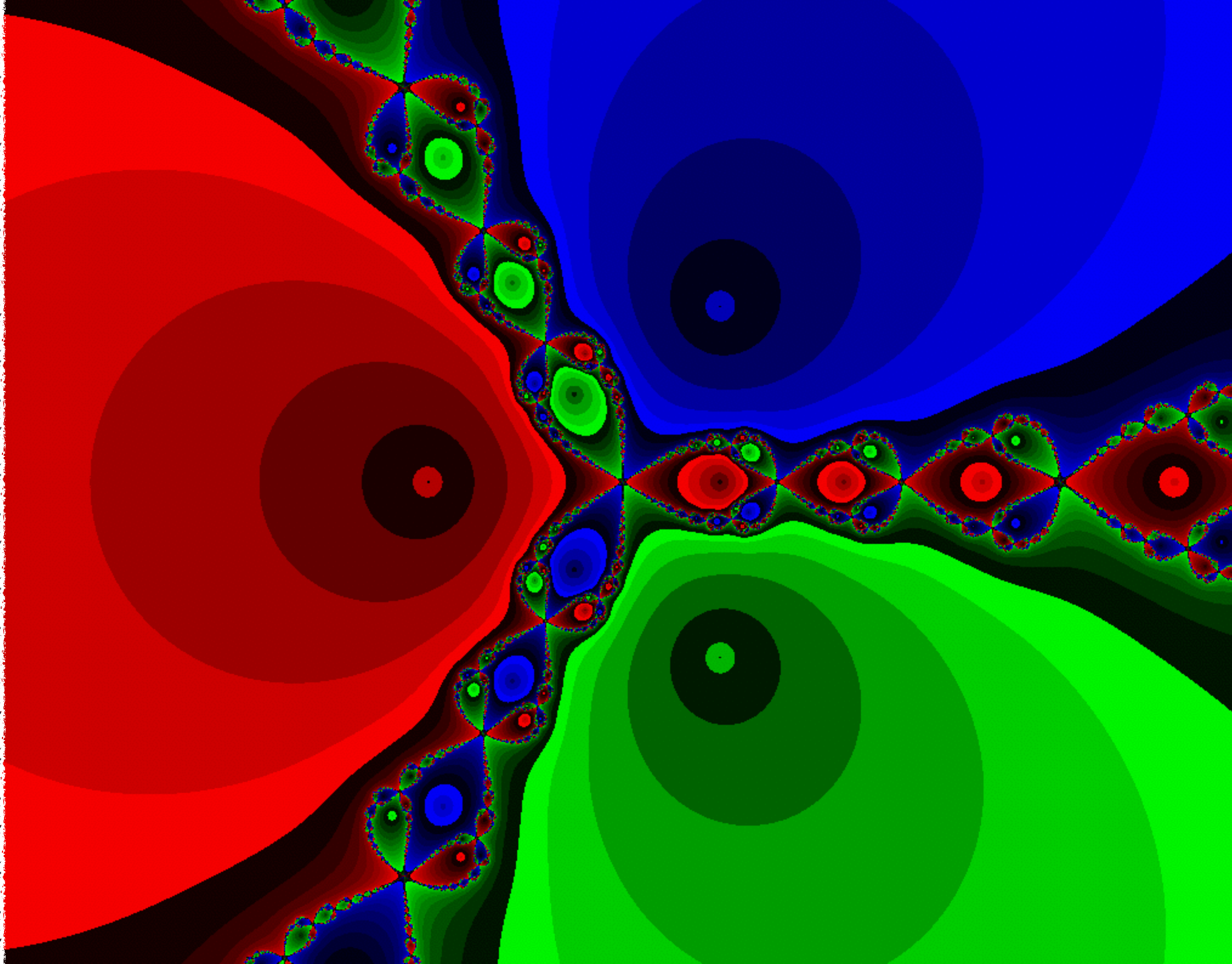

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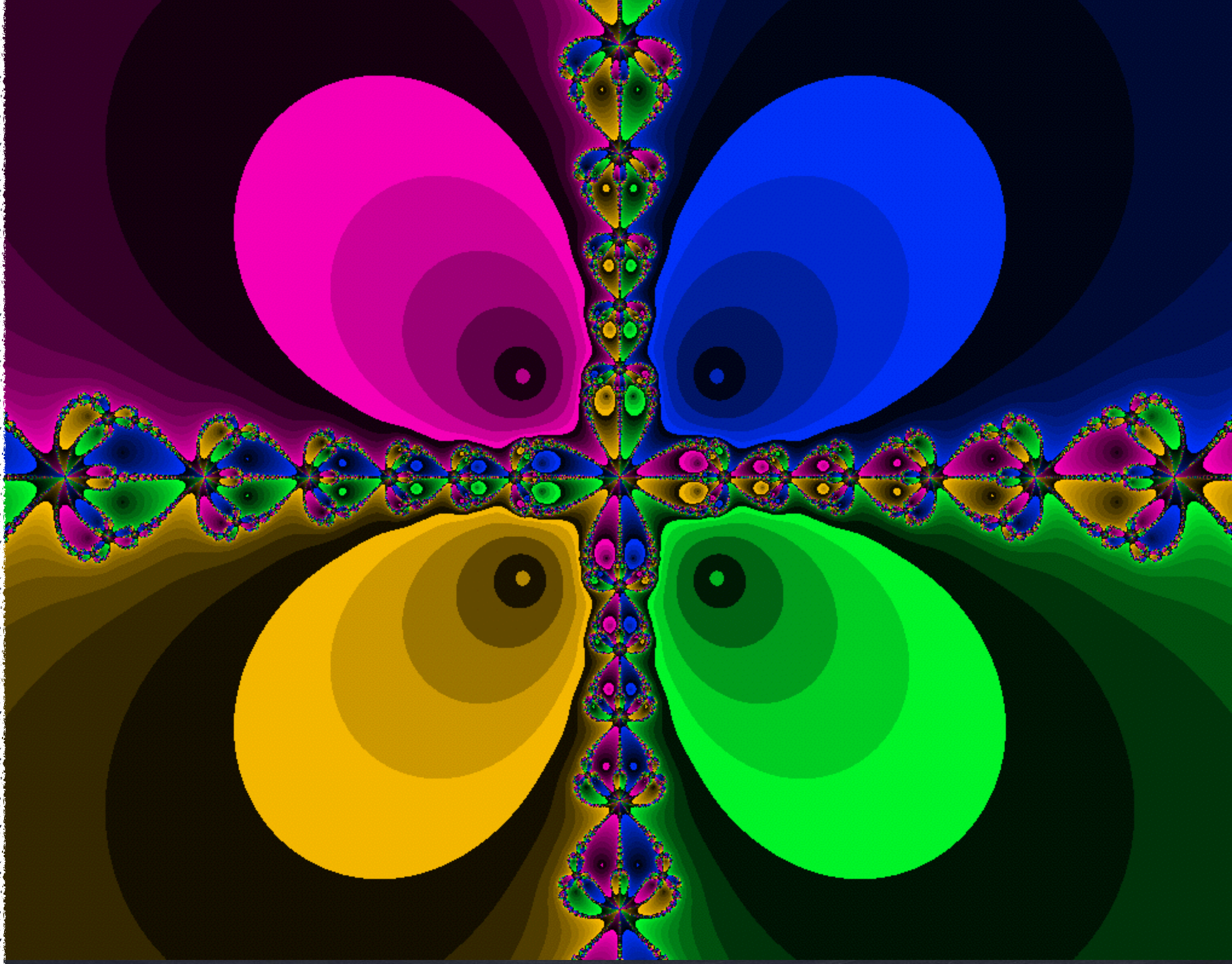
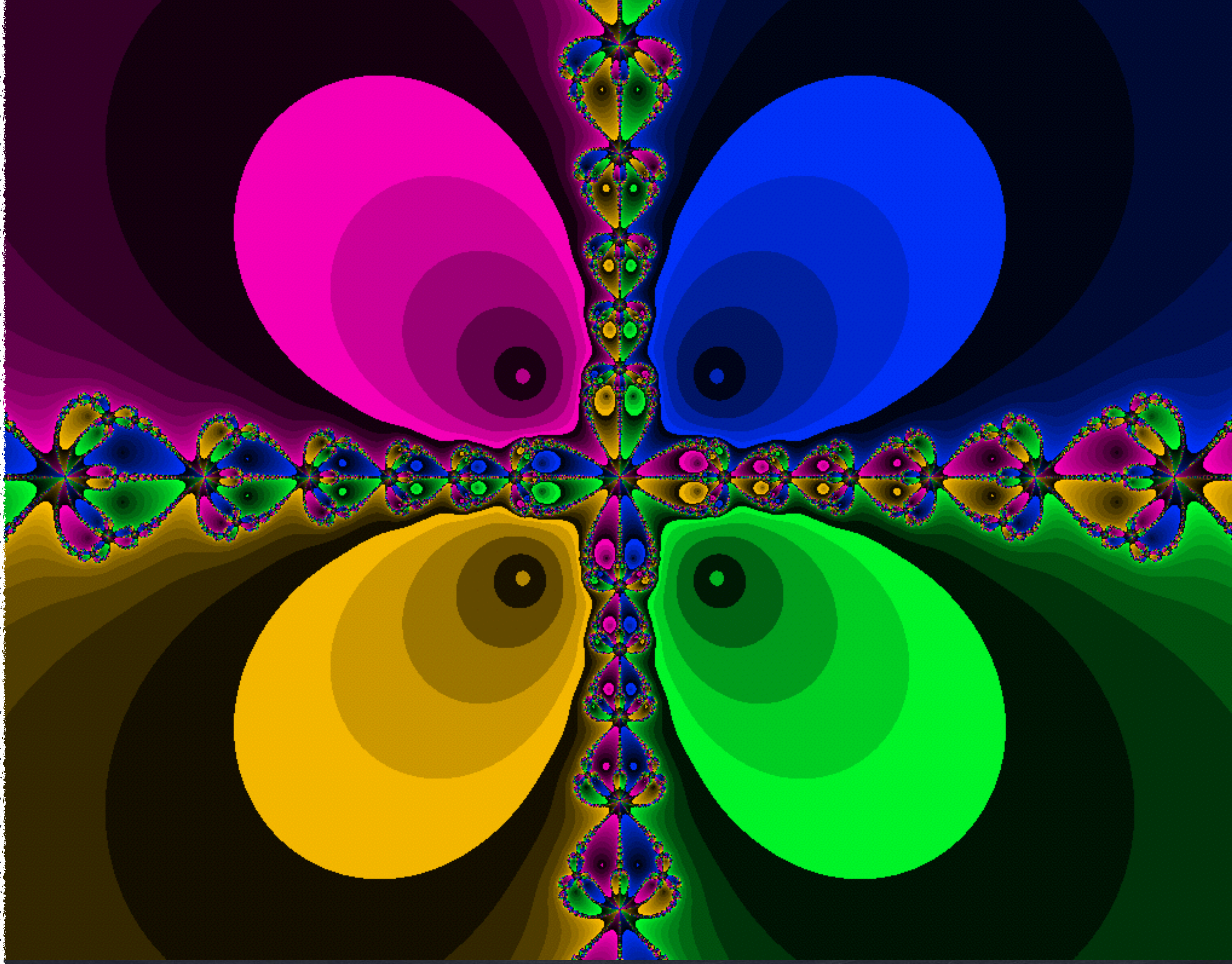


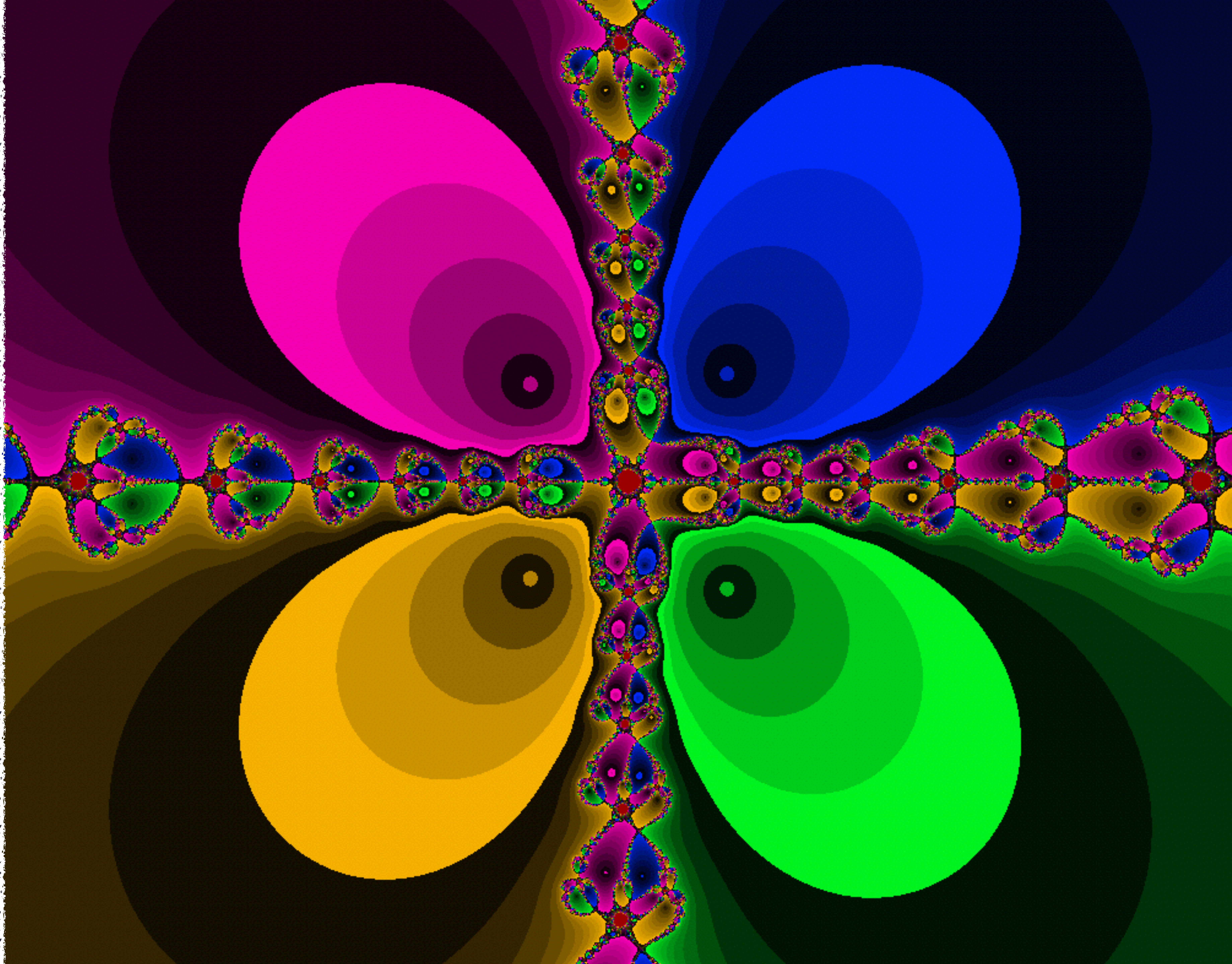
$$f(x) = x^4 + ax + 1$$

$$a = 0$$



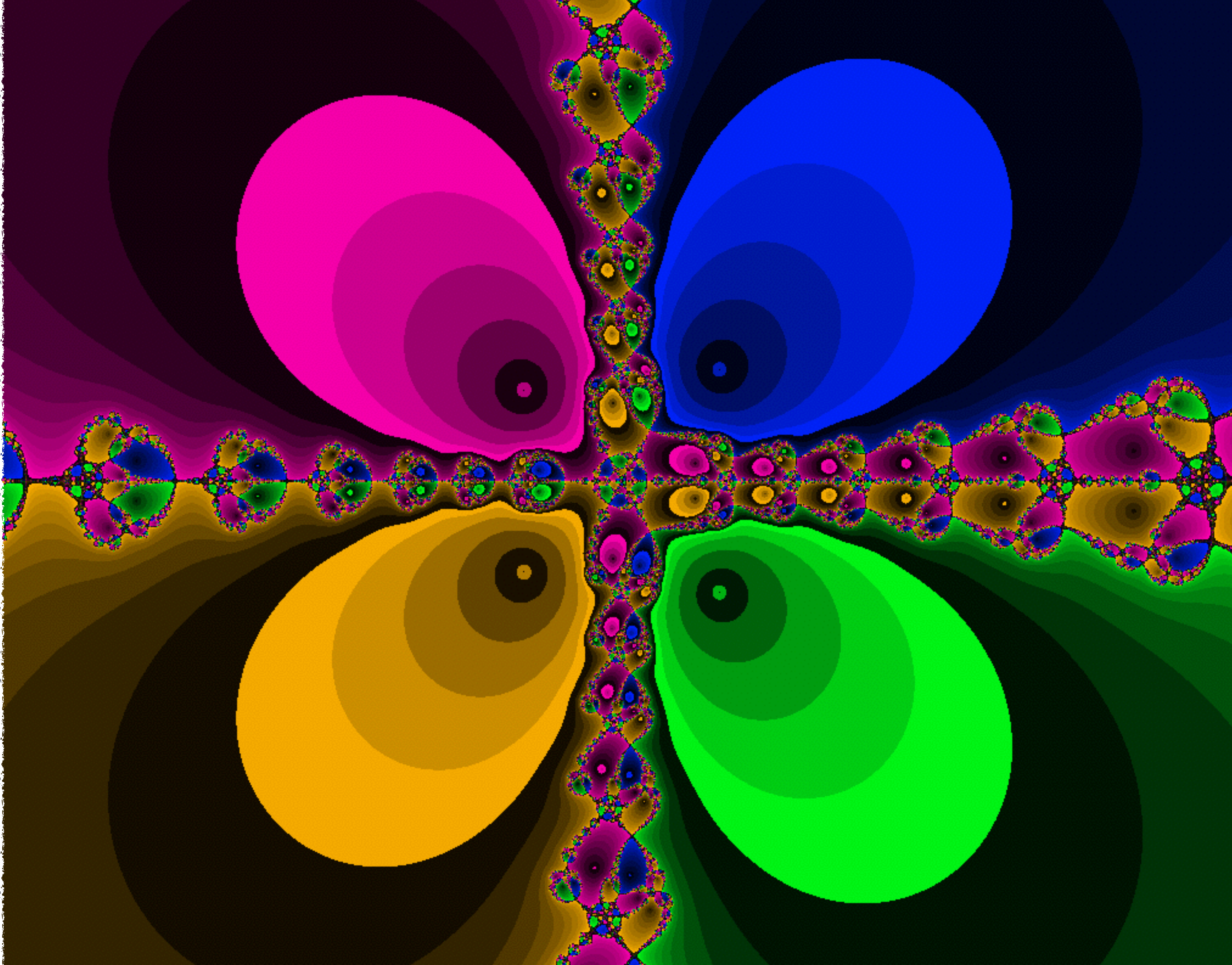
$f(x) = x^4 + a x + 1$

$a = 0.2$



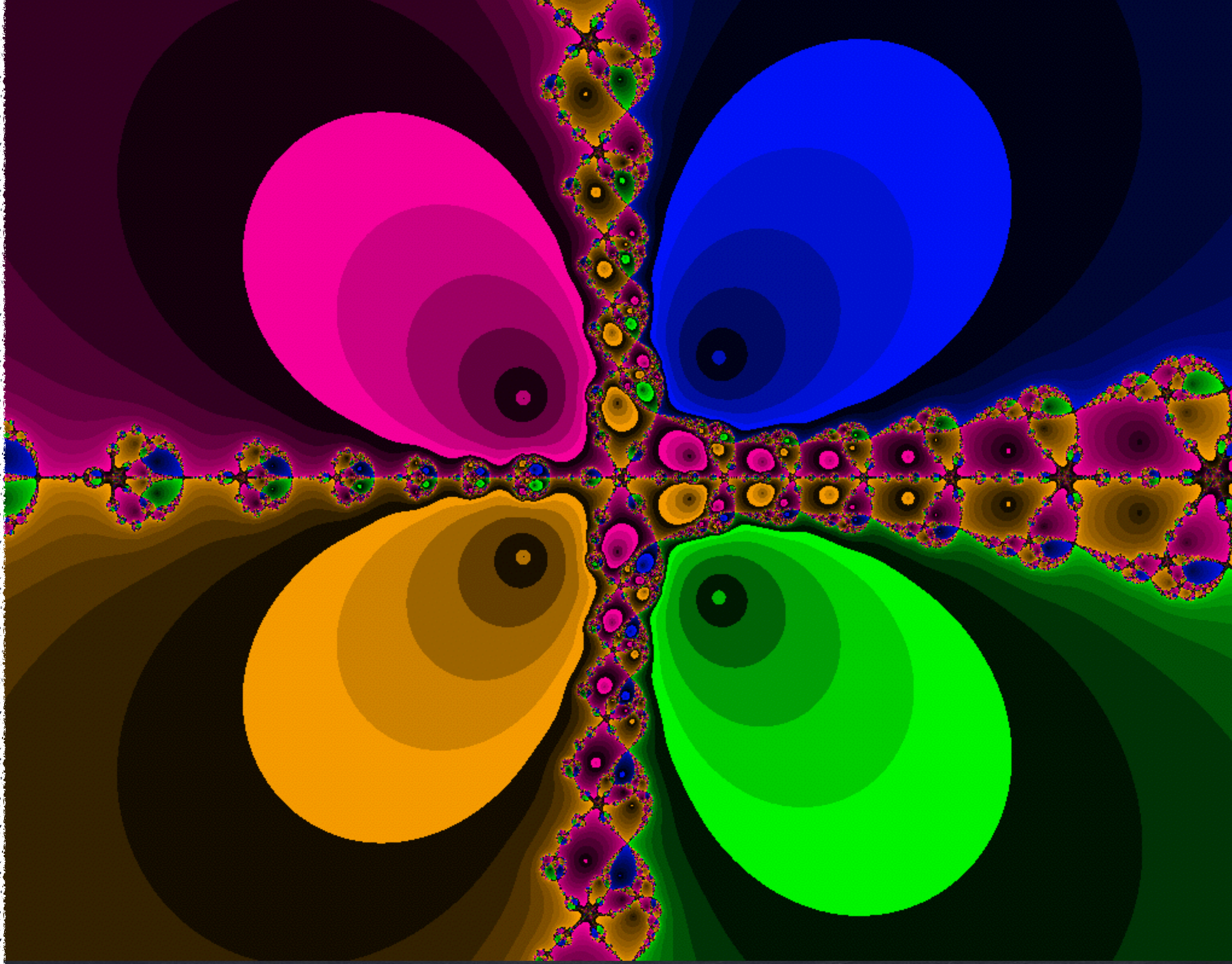
$$f(x) = x^4 + ax + 1$$

$$a = 0.4$$



$f(x) = x^4 + ax + 1$

$a = 0.8$



$f(x) = x^4 + ax + 1$

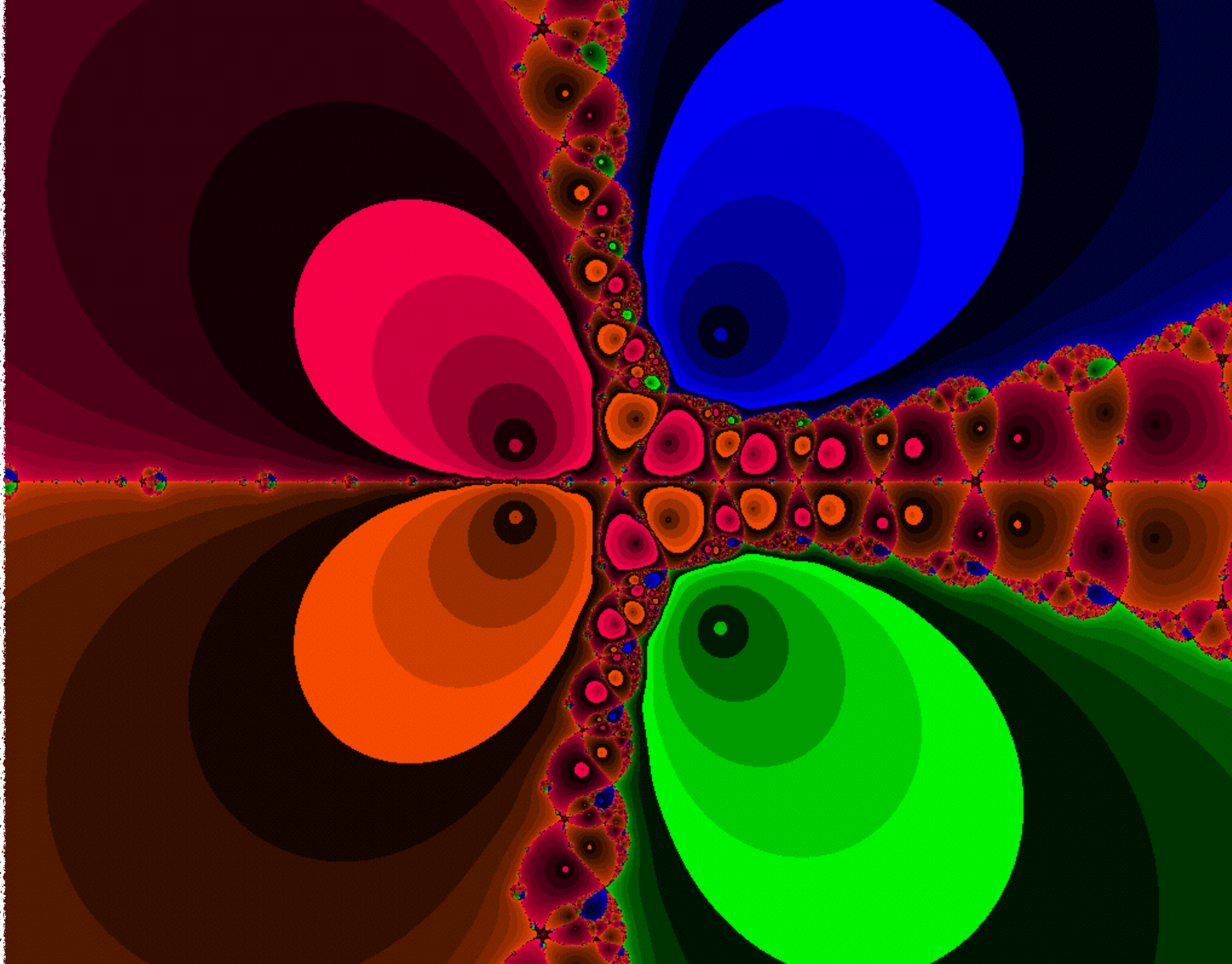
$a = 1.2$

$f(x) = x^4 + ax + 1$

$a = 1.7$

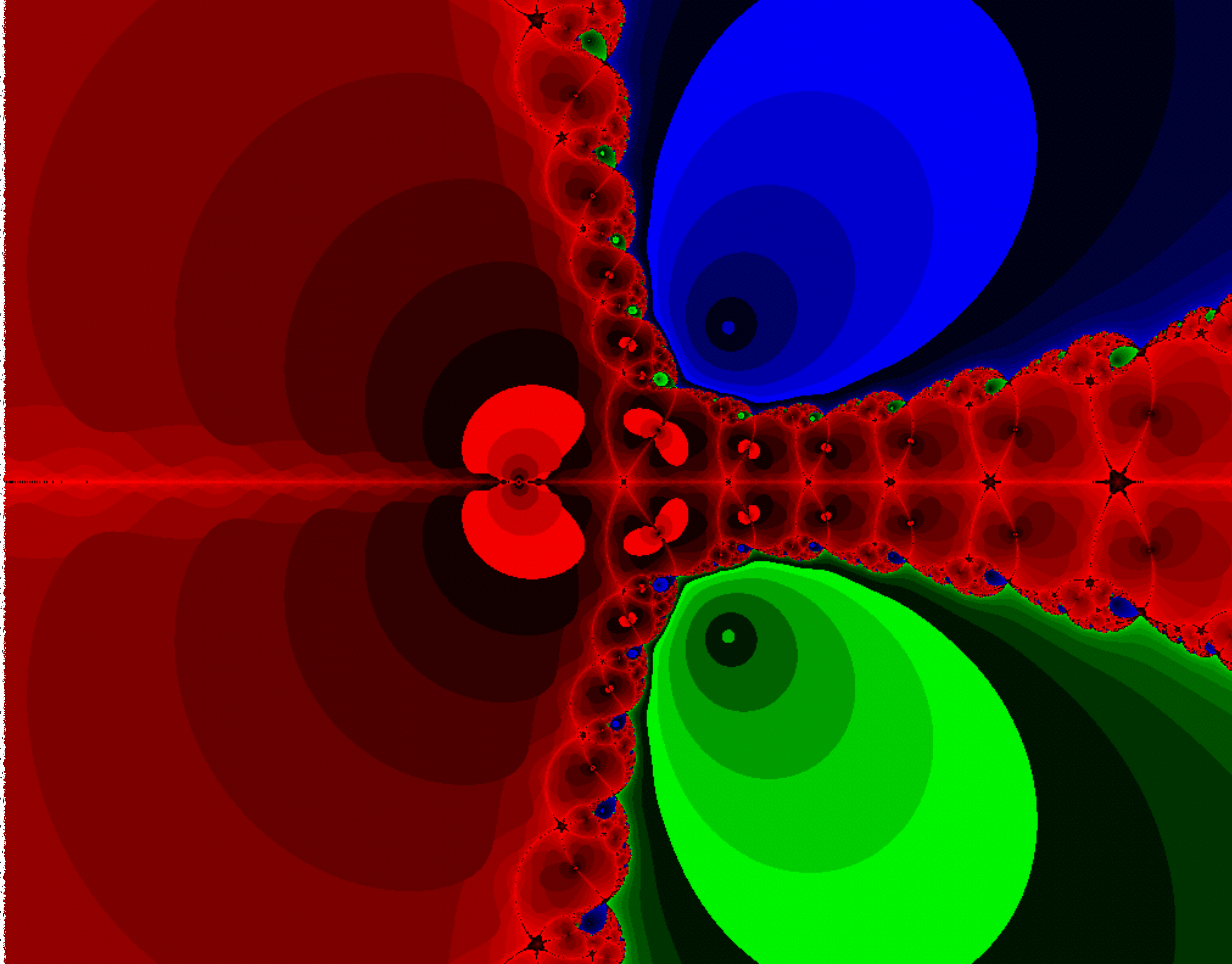
$f(x) = x^4 + ax + 1$

$a = 2.1$



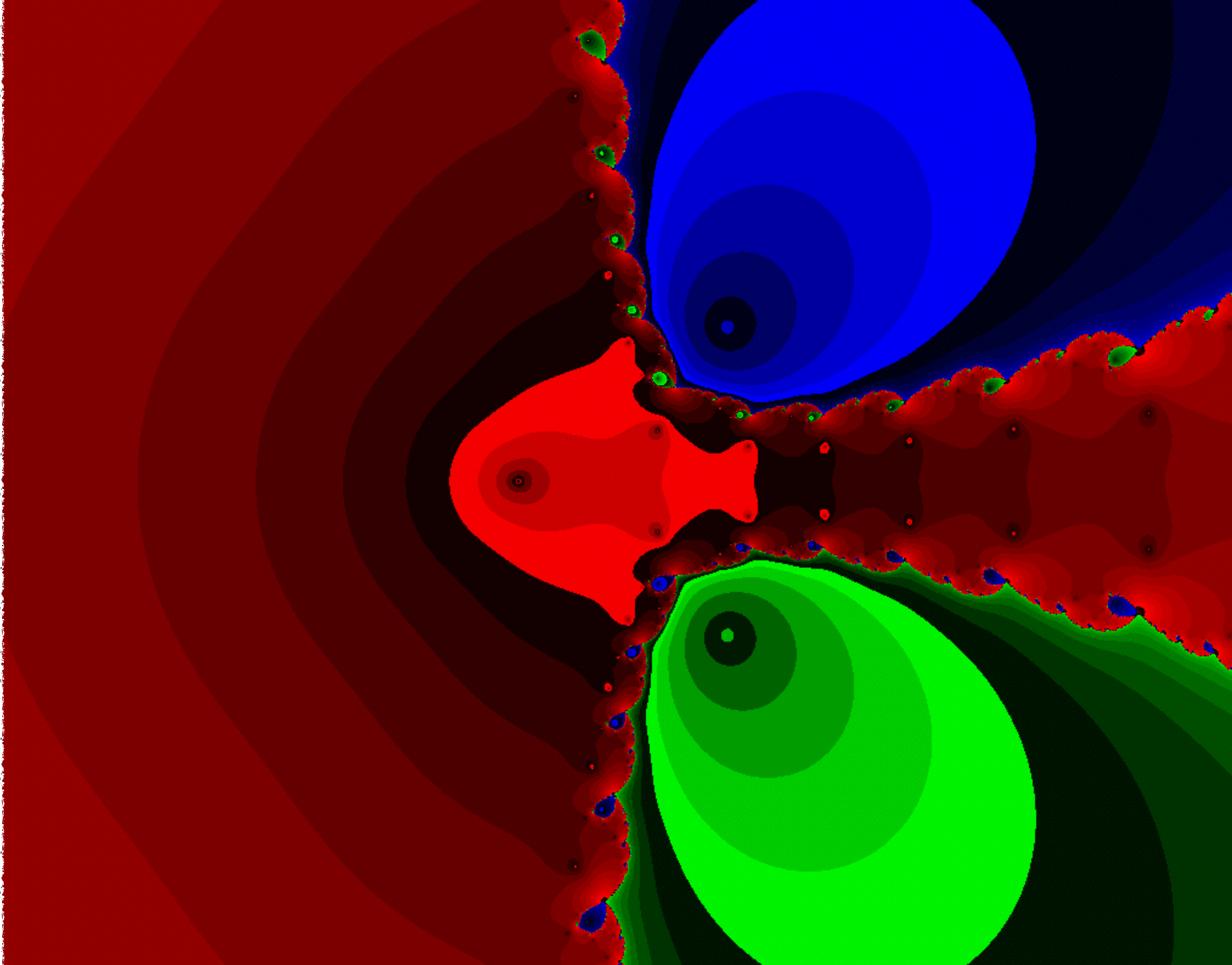
$f(x) = x^4 + ax + 1$

$a = 2.4814$



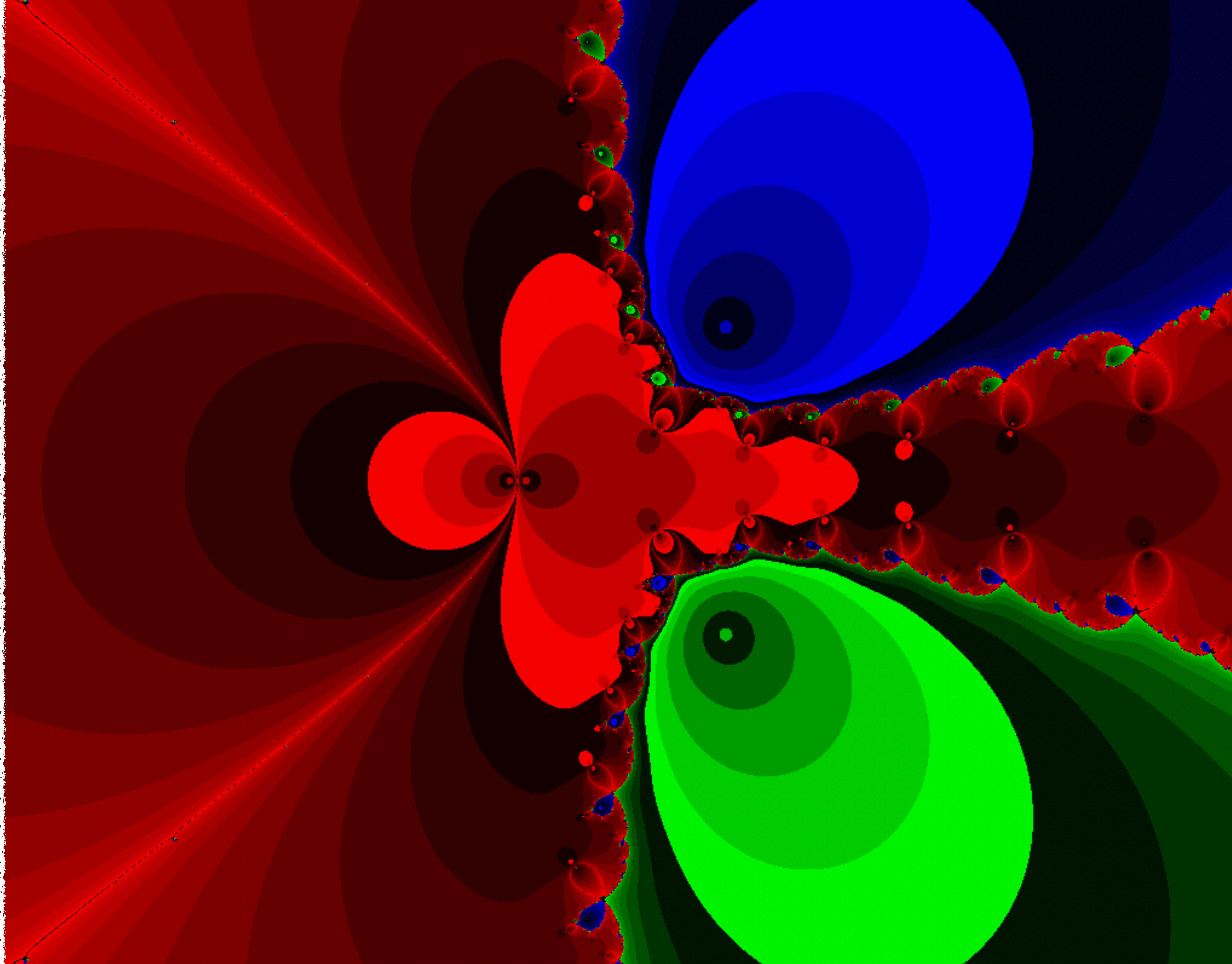
$f(x) = x^4 + ax + 1$

$a = 2.4817$



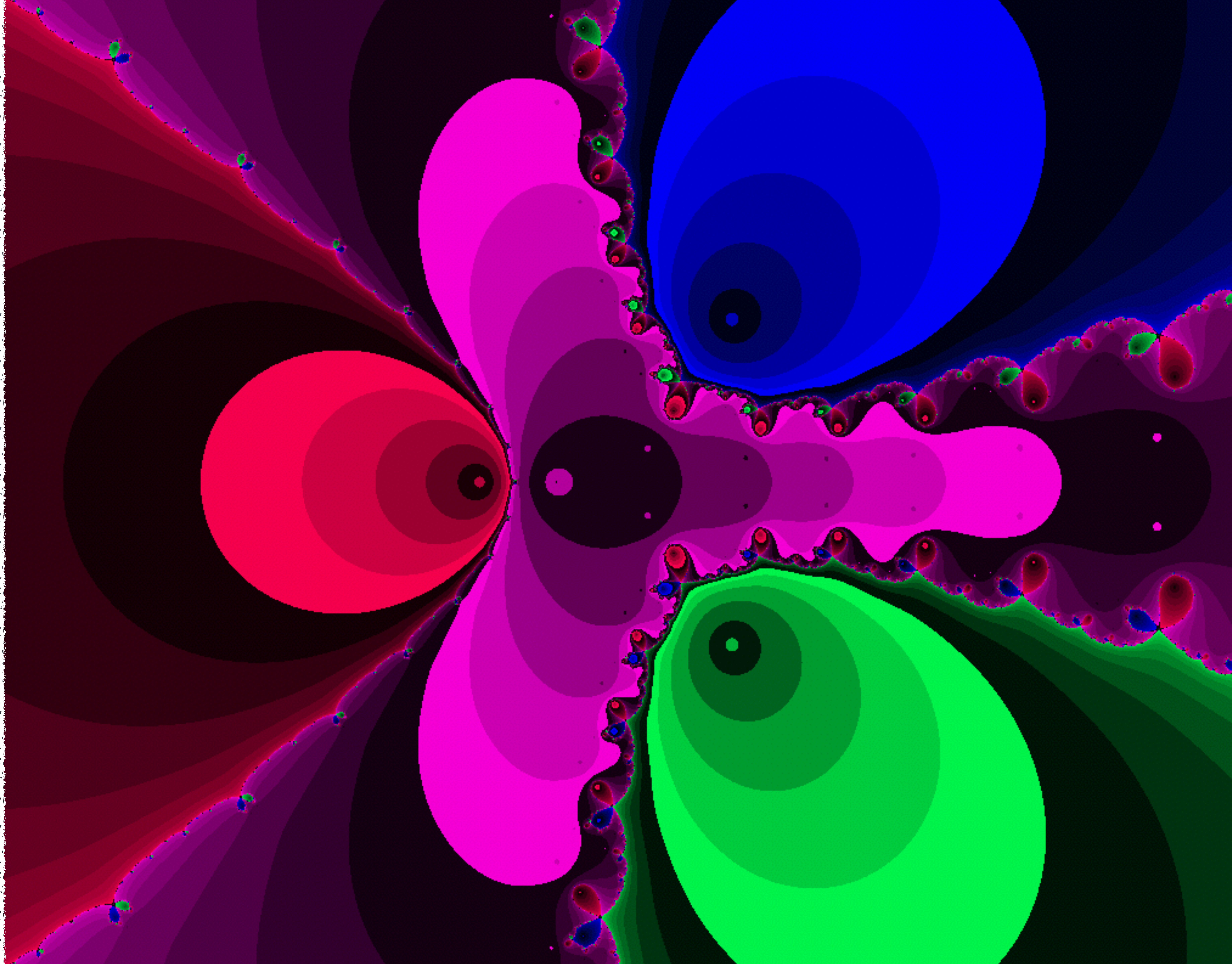
$f(x) = x^4 + ax + 1$

$a = 2.5$



$f(x) = x^4 + ax + 1$

$a = 2.5$



Video von Mike Hartley