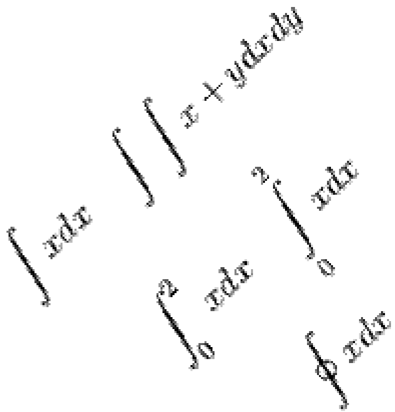
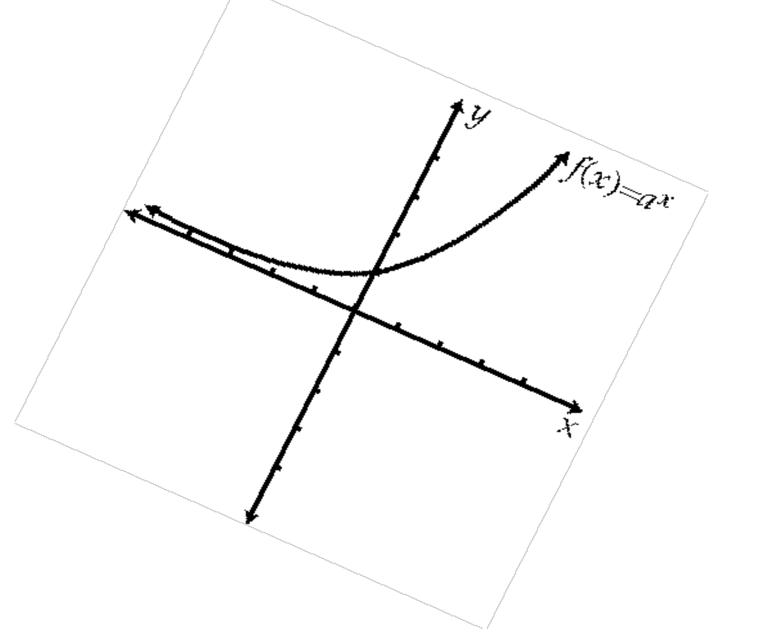
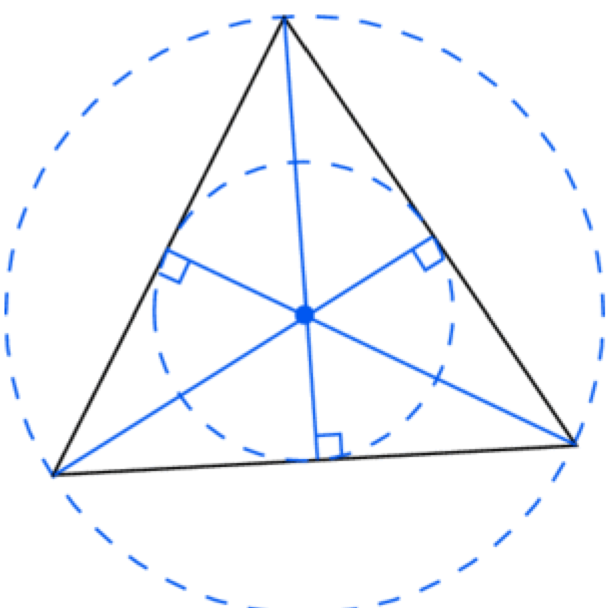
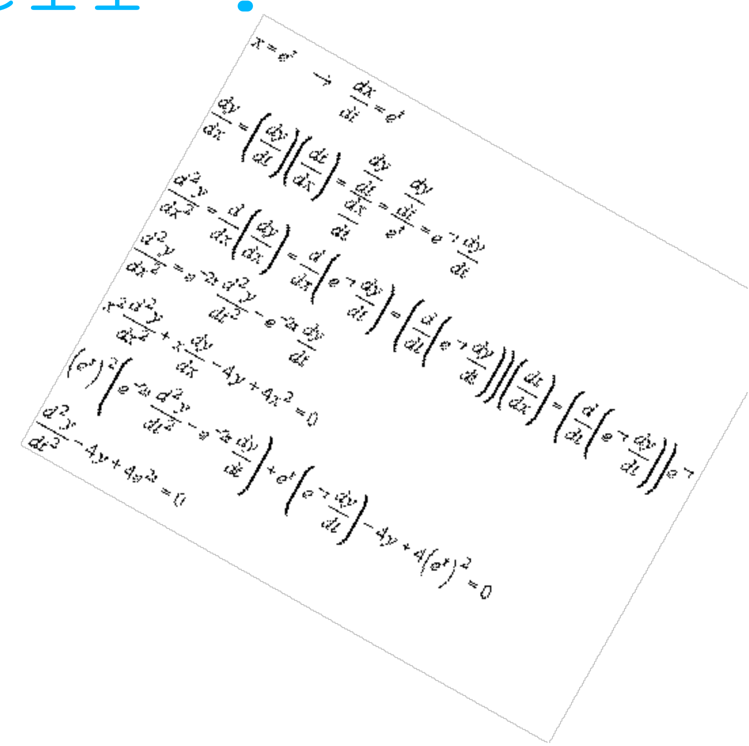

THE NAUTILUS





Is there a link between math and the nautilus shell ?





Fibonacci's Sequence

1 1 2 3 5 8 13 21 34 55 89 144 233 377 610

987 1597 2584 4181 6765 10946

17711 28657 46368 75025 121393

196418 317811 514229

832040 ...

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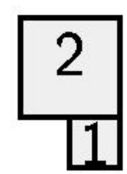
1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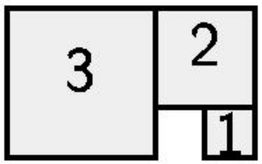
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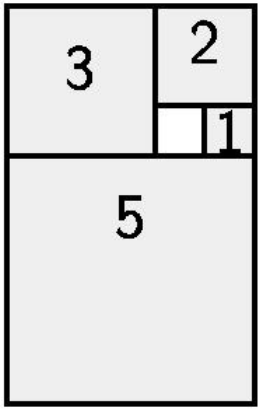
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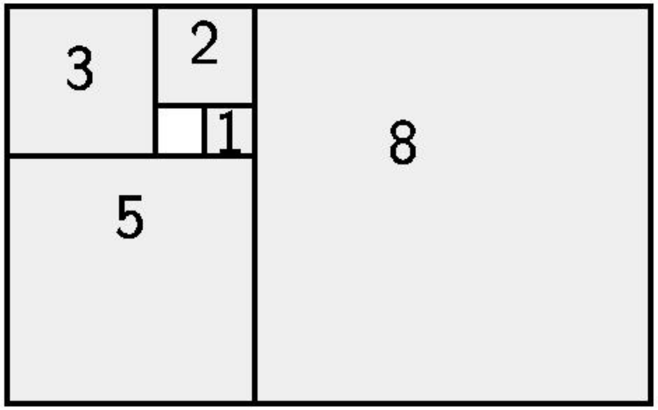
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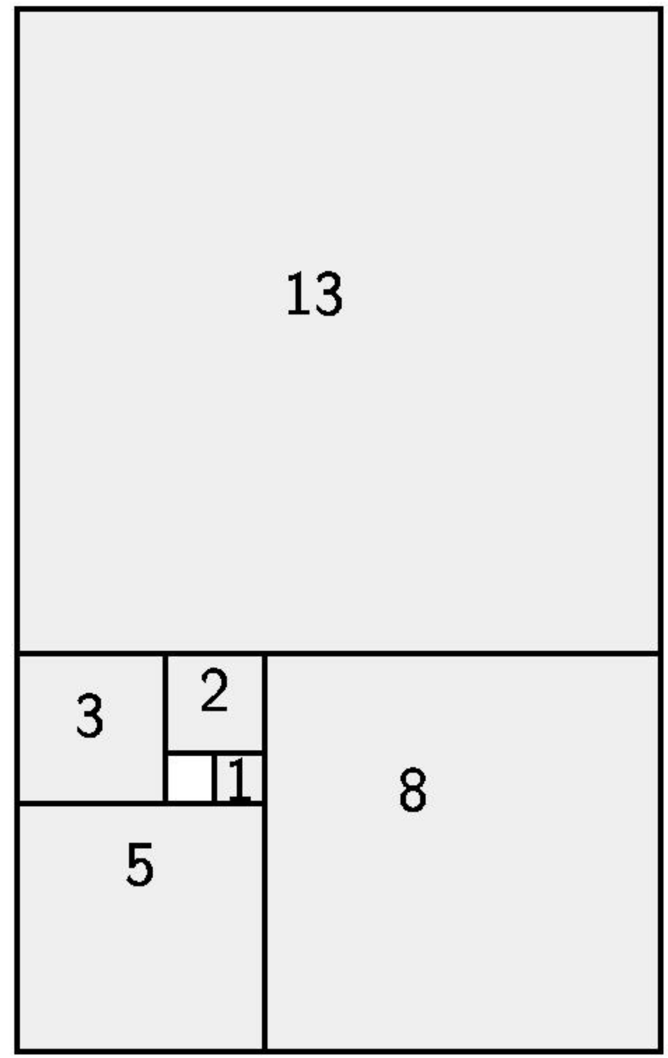
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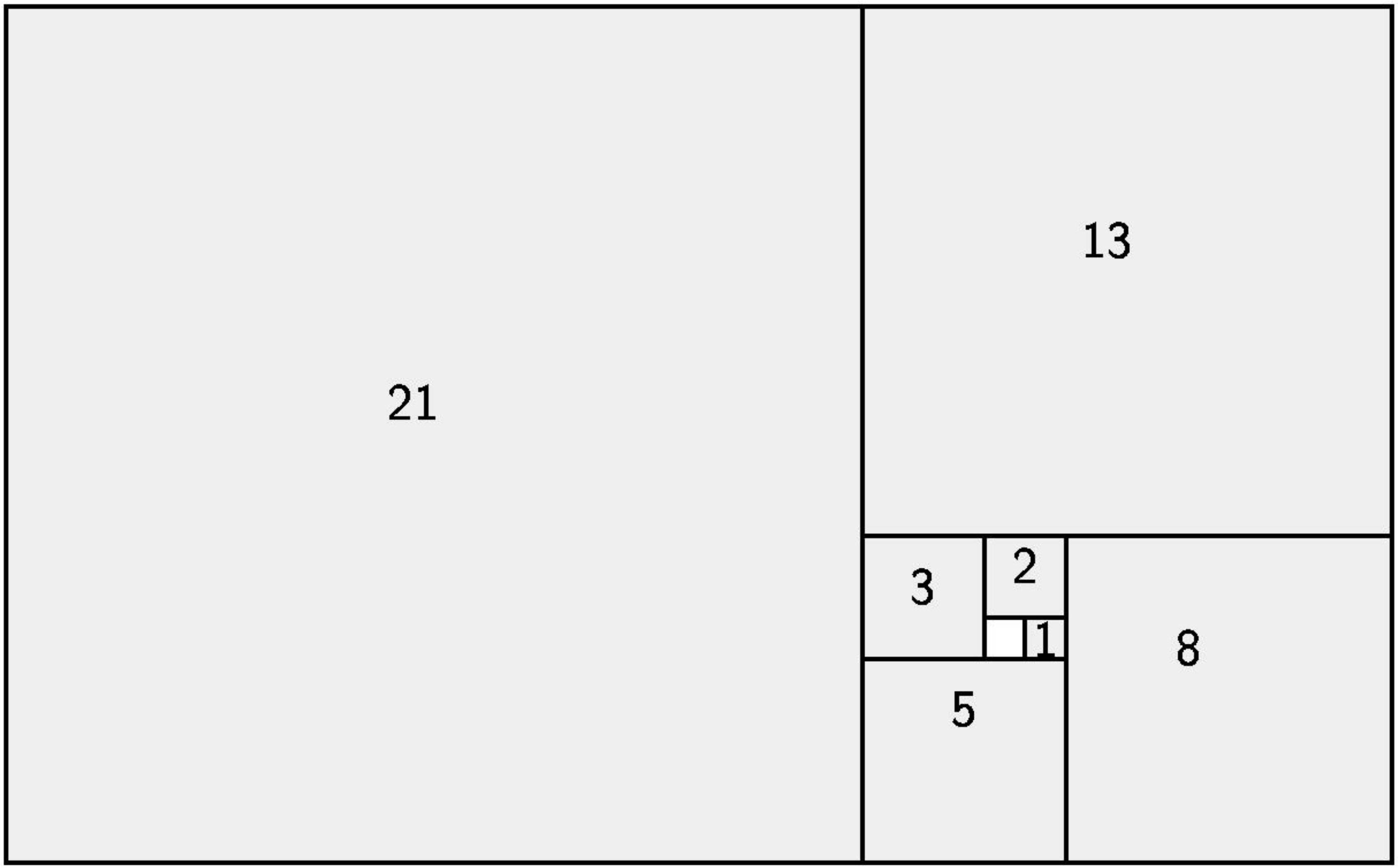

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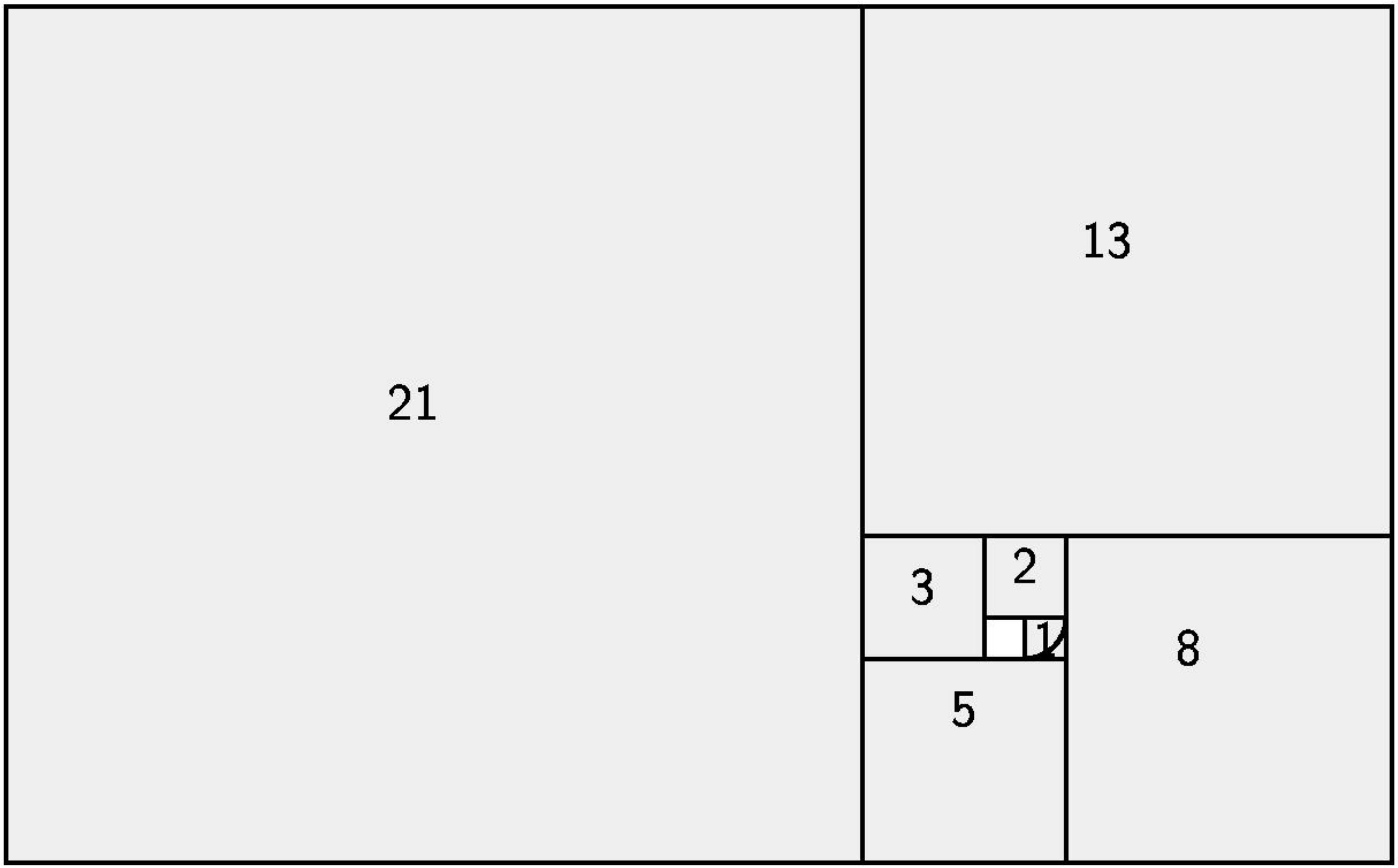
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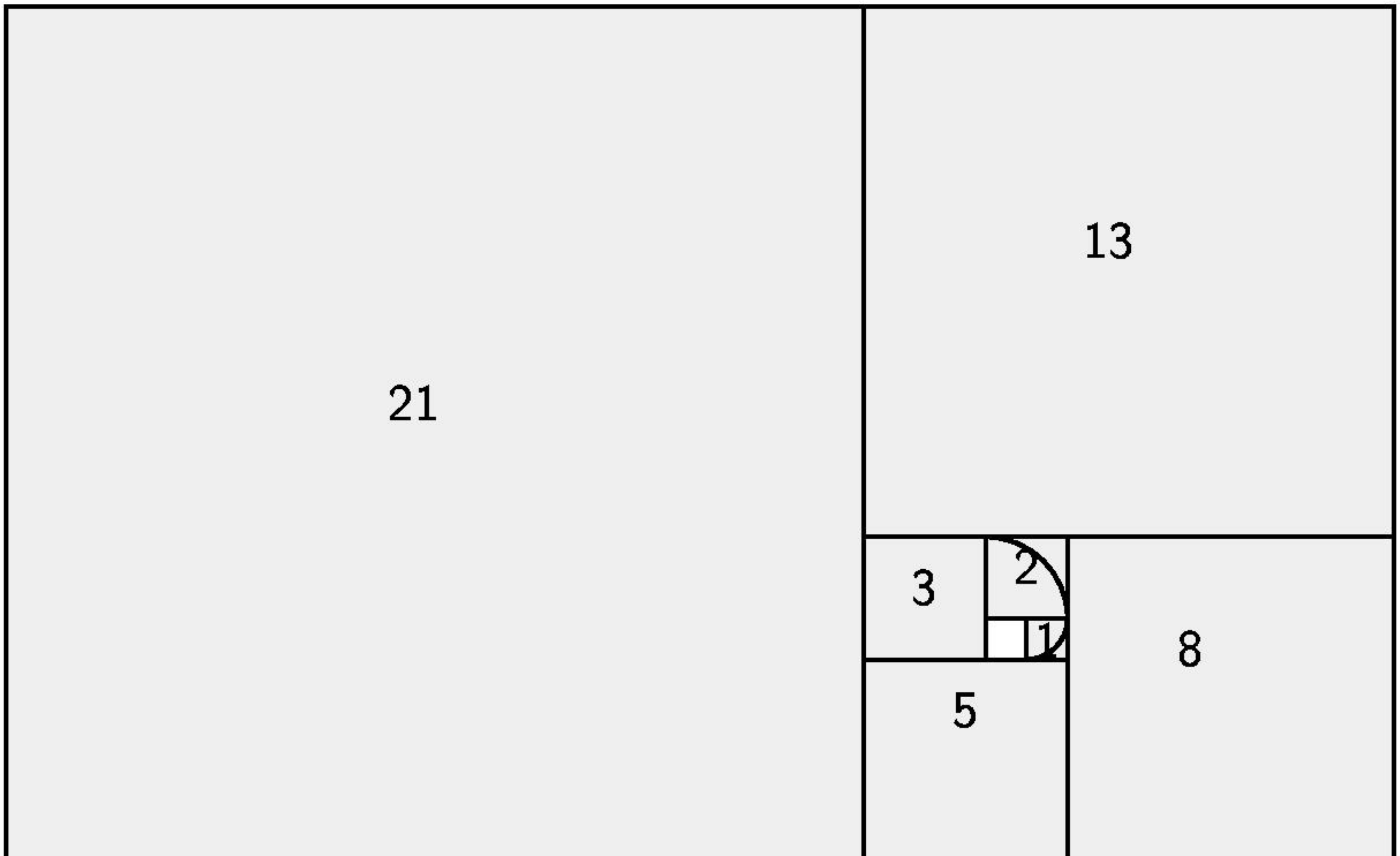
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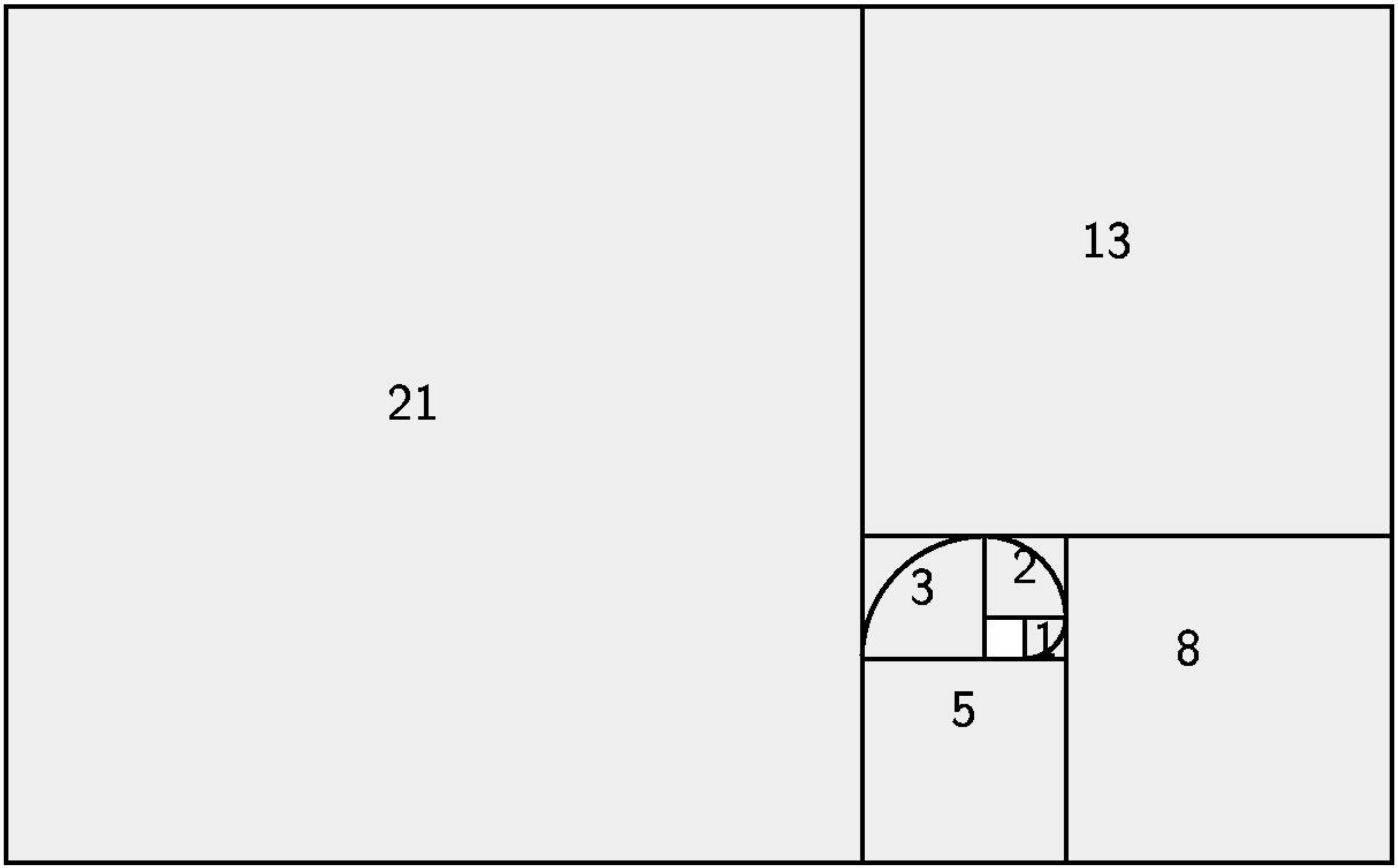
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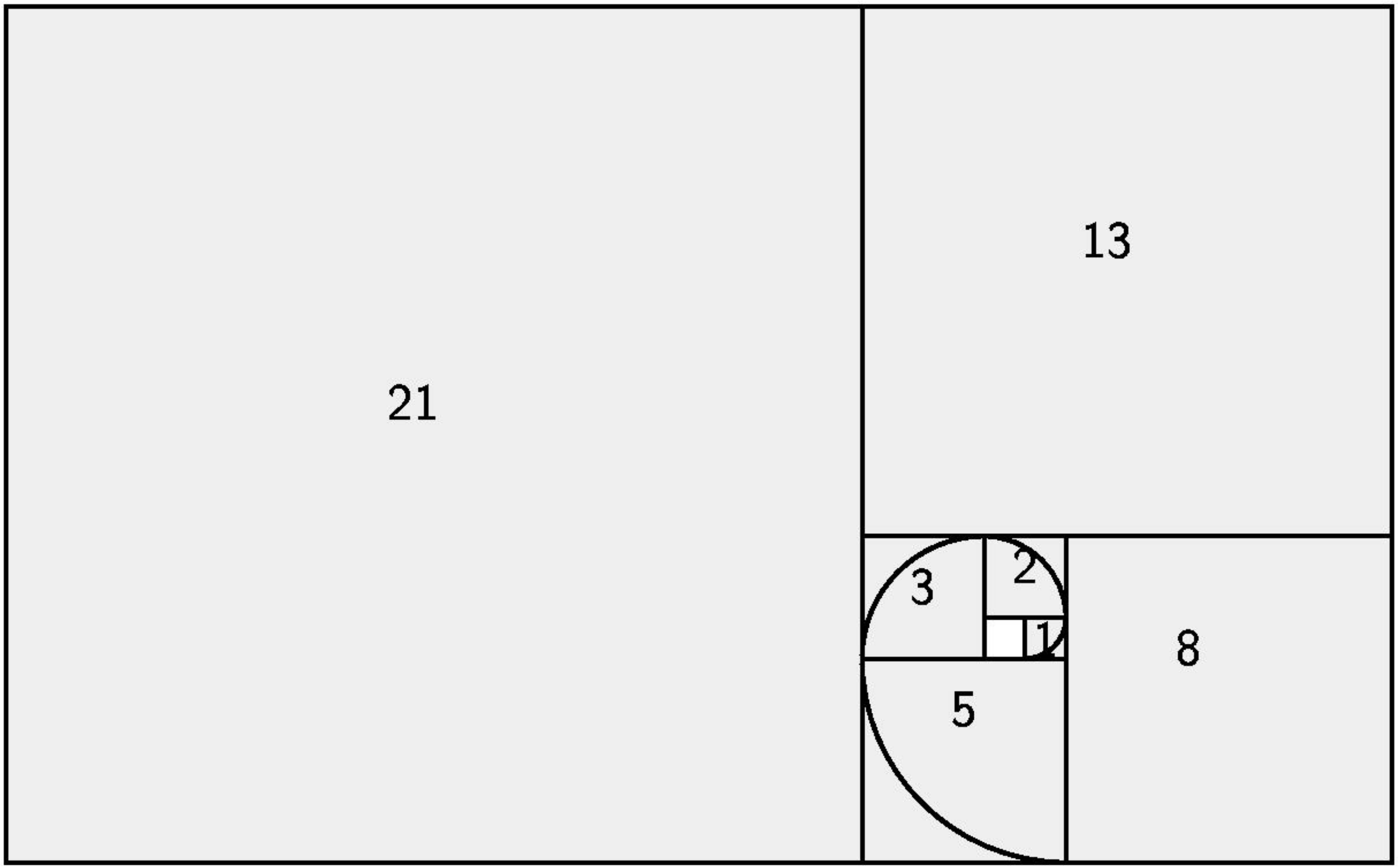
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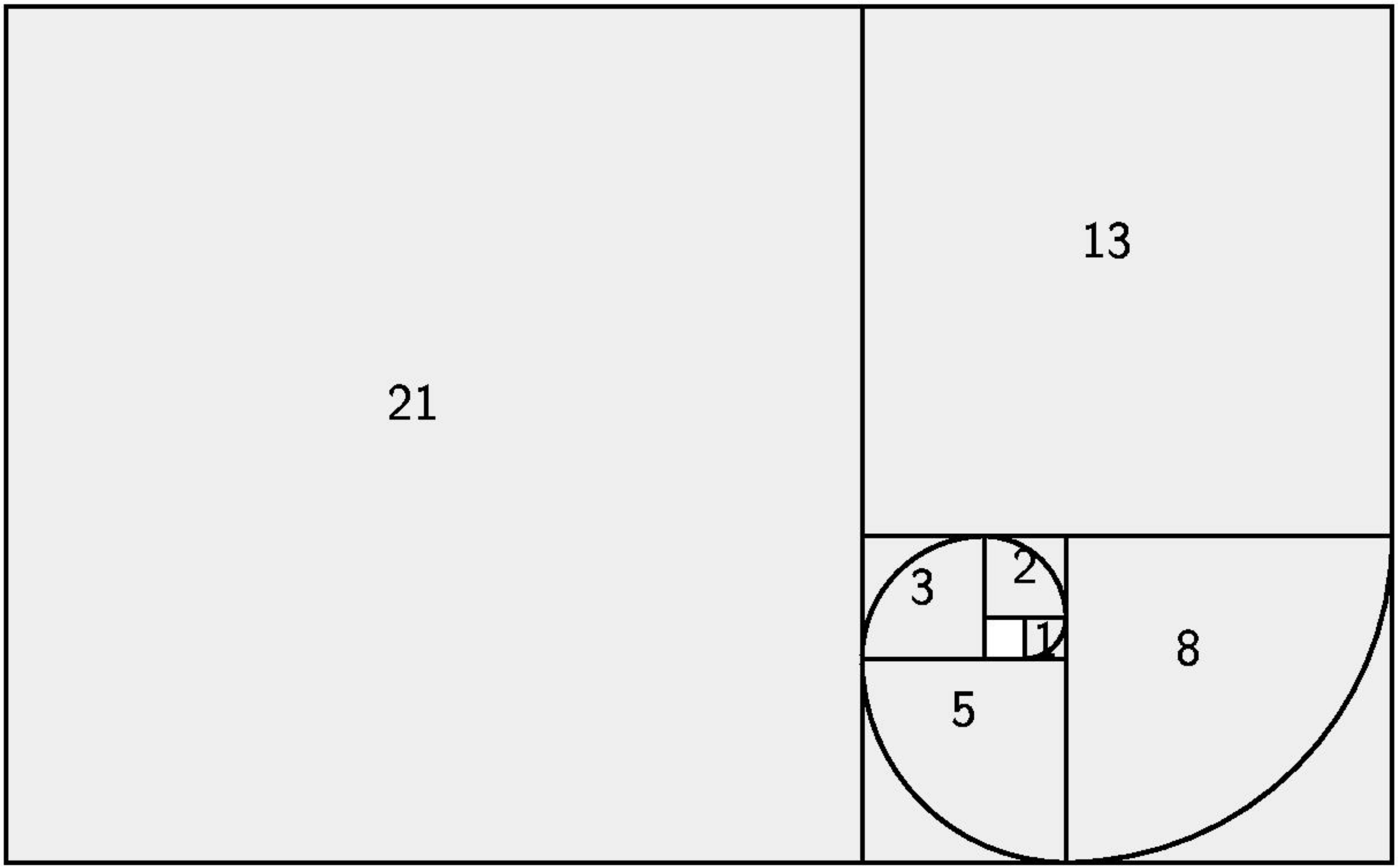
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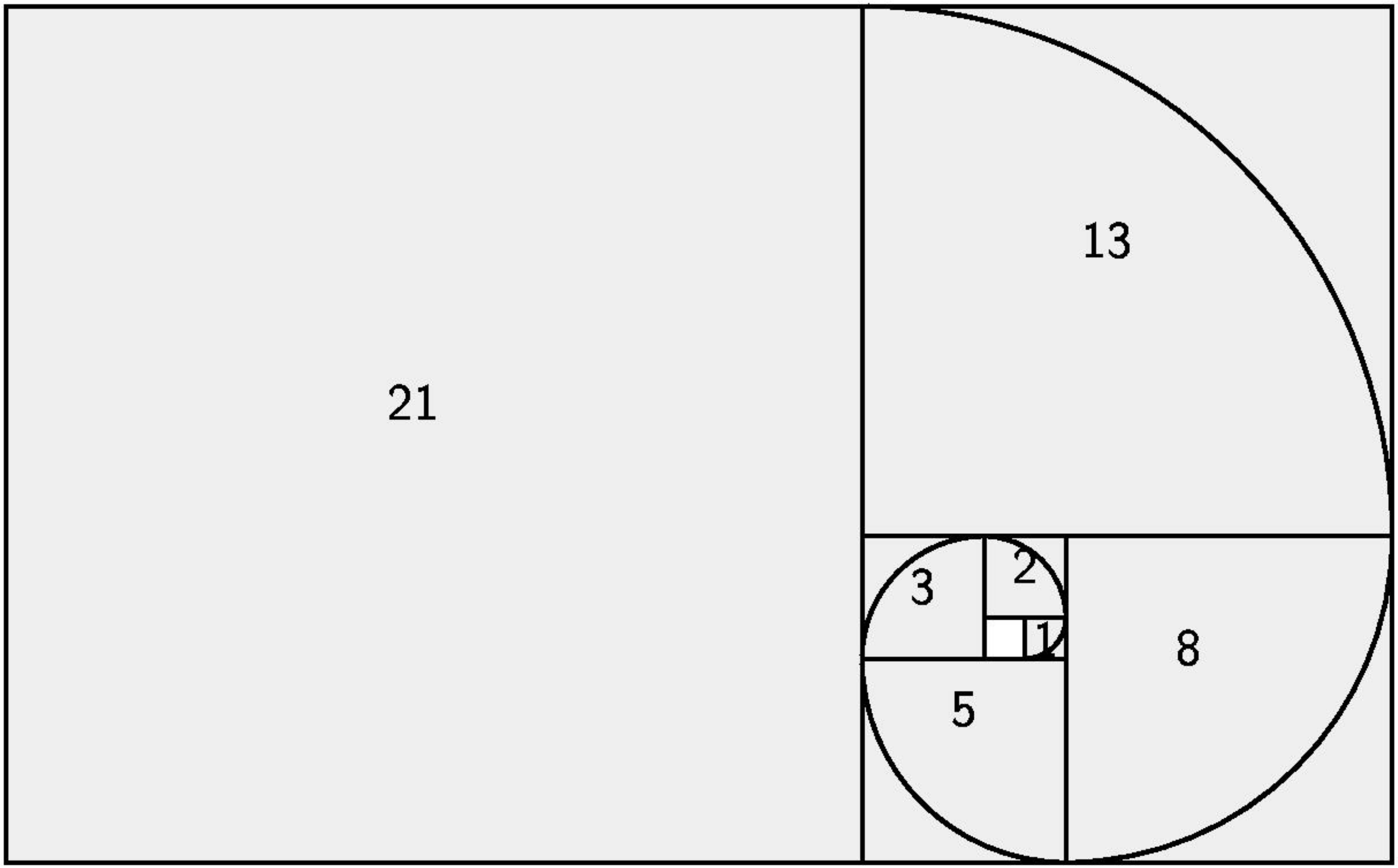
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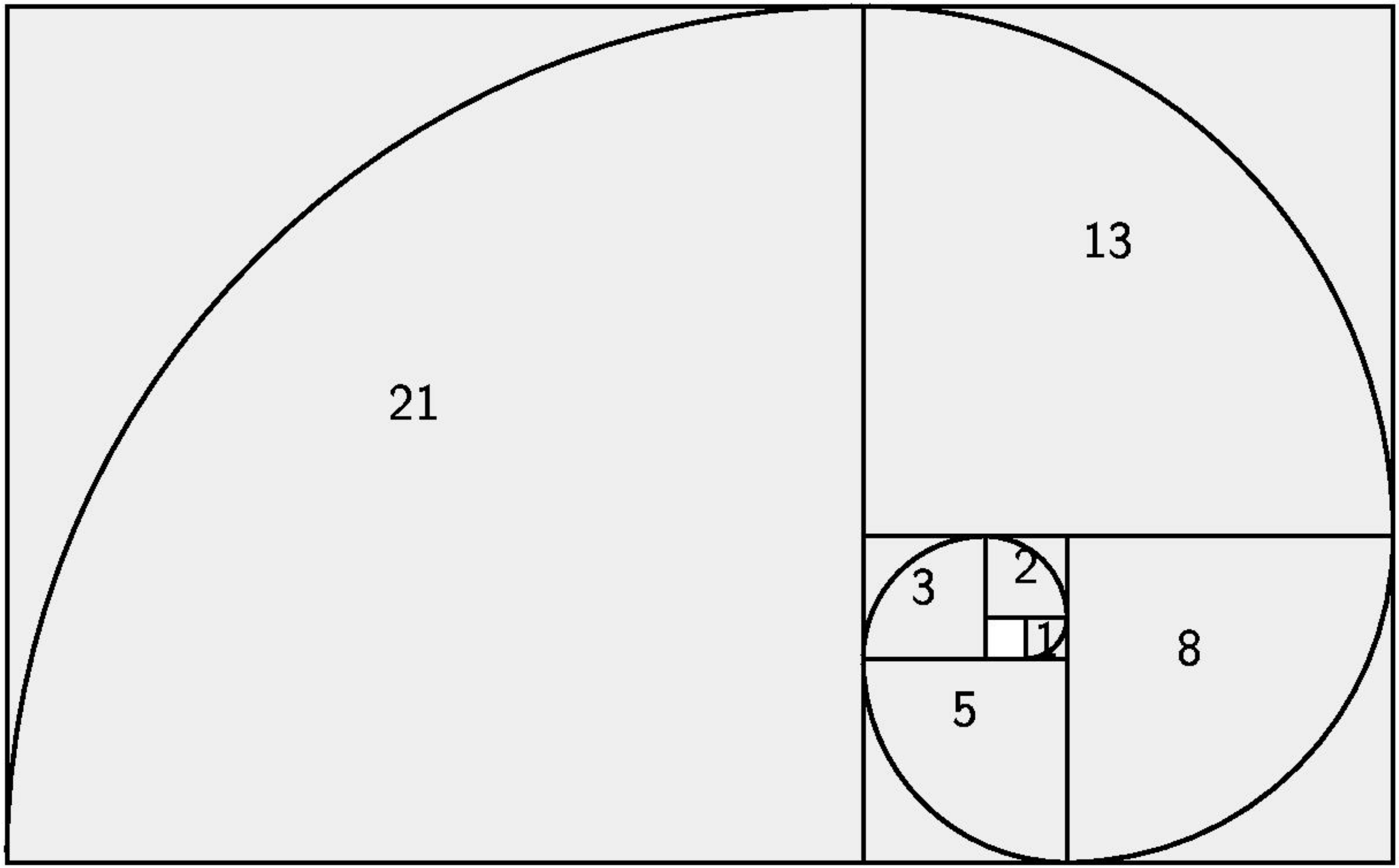
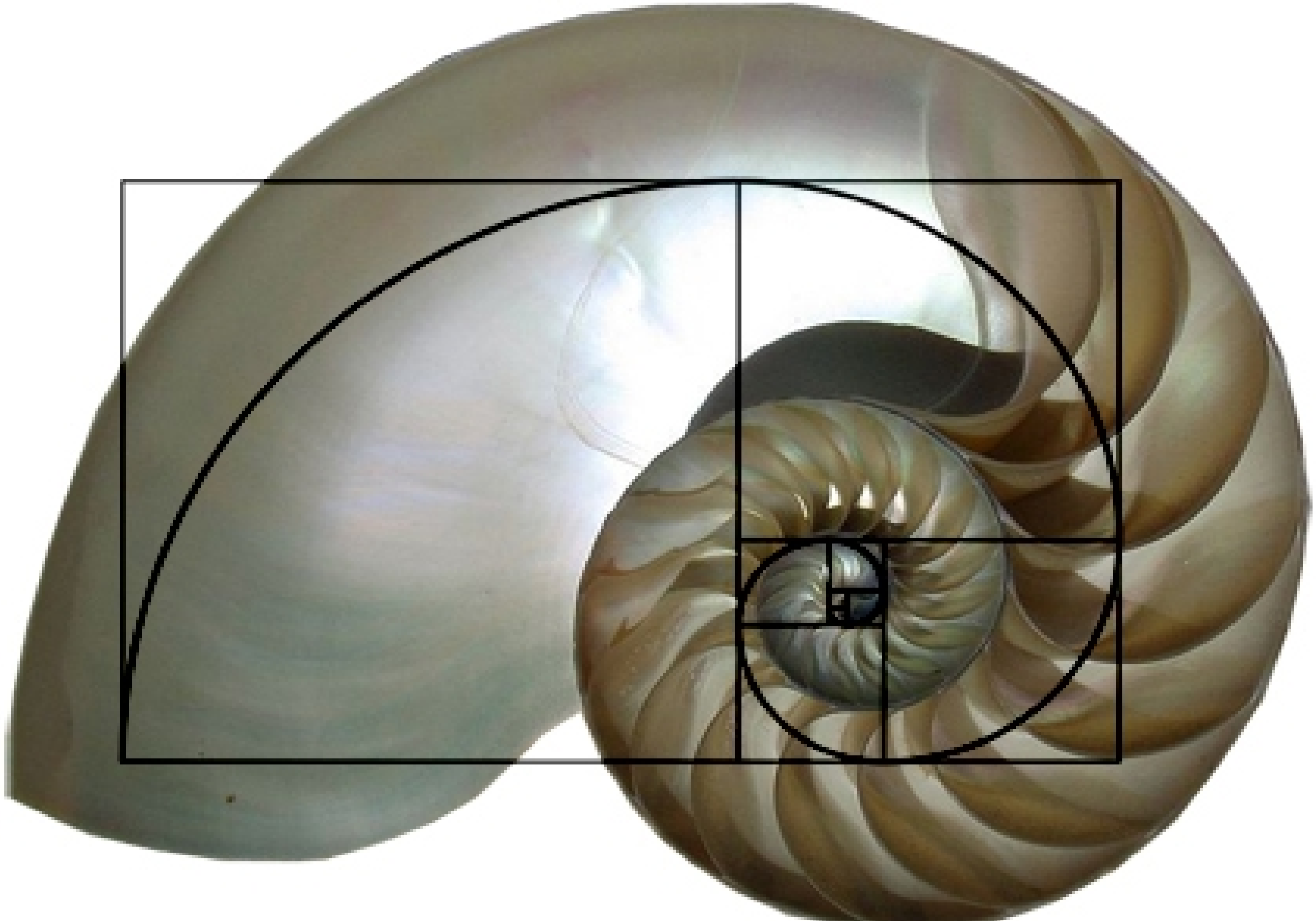
The golden spiral



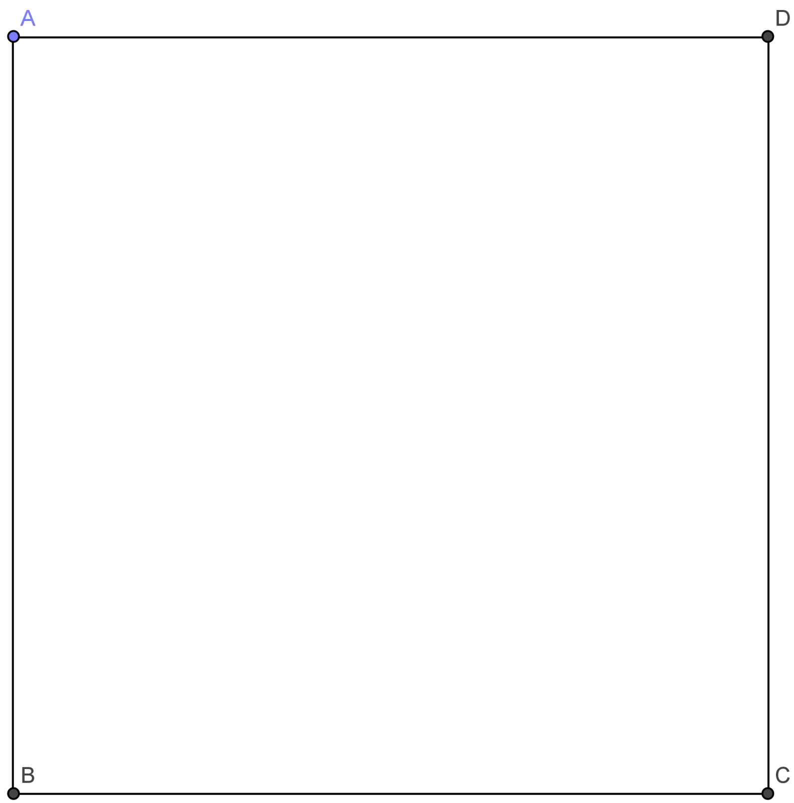


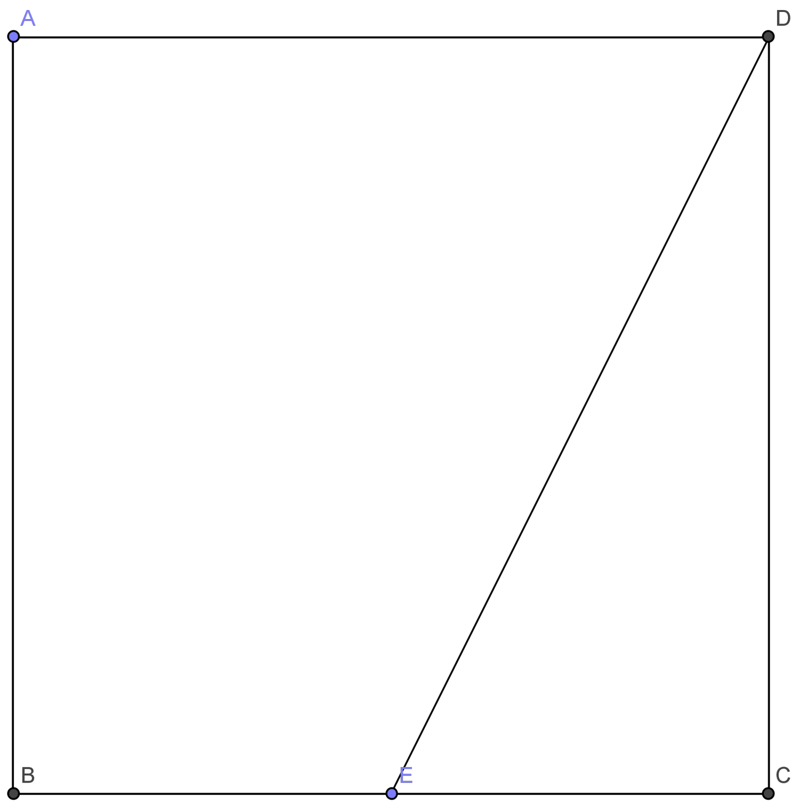
The golden ratio φ

Fibonacci's sequence	(n+1)/n
1	1
1	2
2	1,5
3	1,666666667
5	1,6
8	1,625
...	
46368	1,618033989
75025	1,6180339887

$$\varphi \approx 1{,}6180339887$$

What's the exact value of the golden ratio ?


A
D
B
C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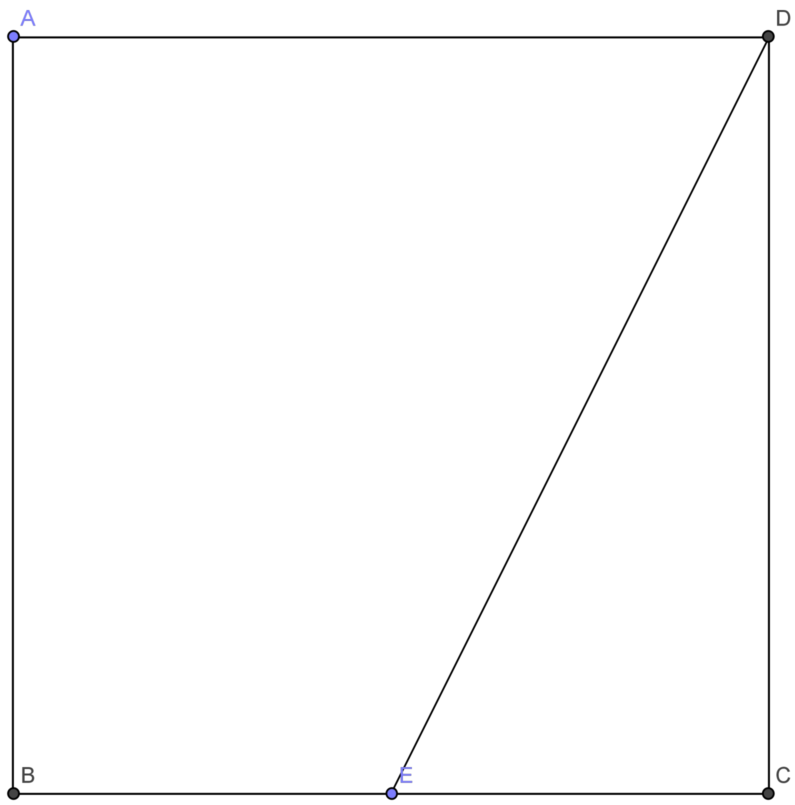
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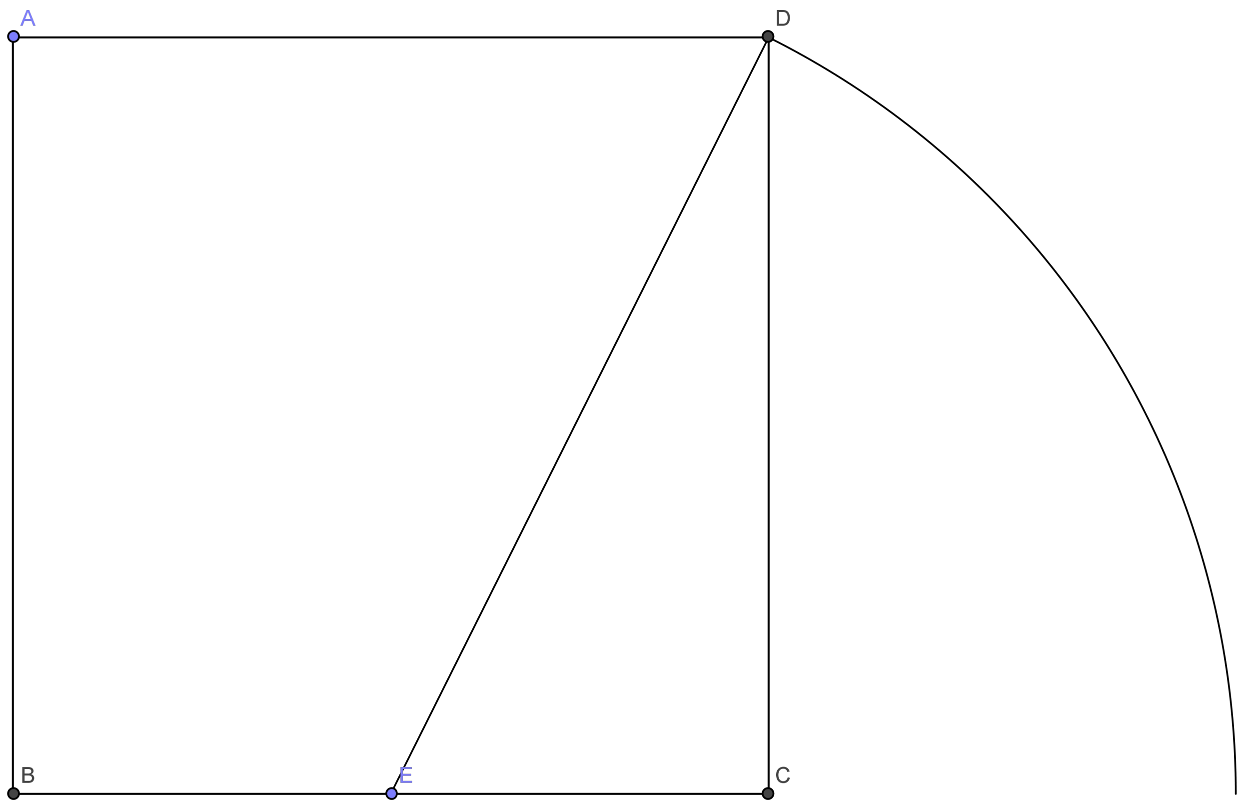
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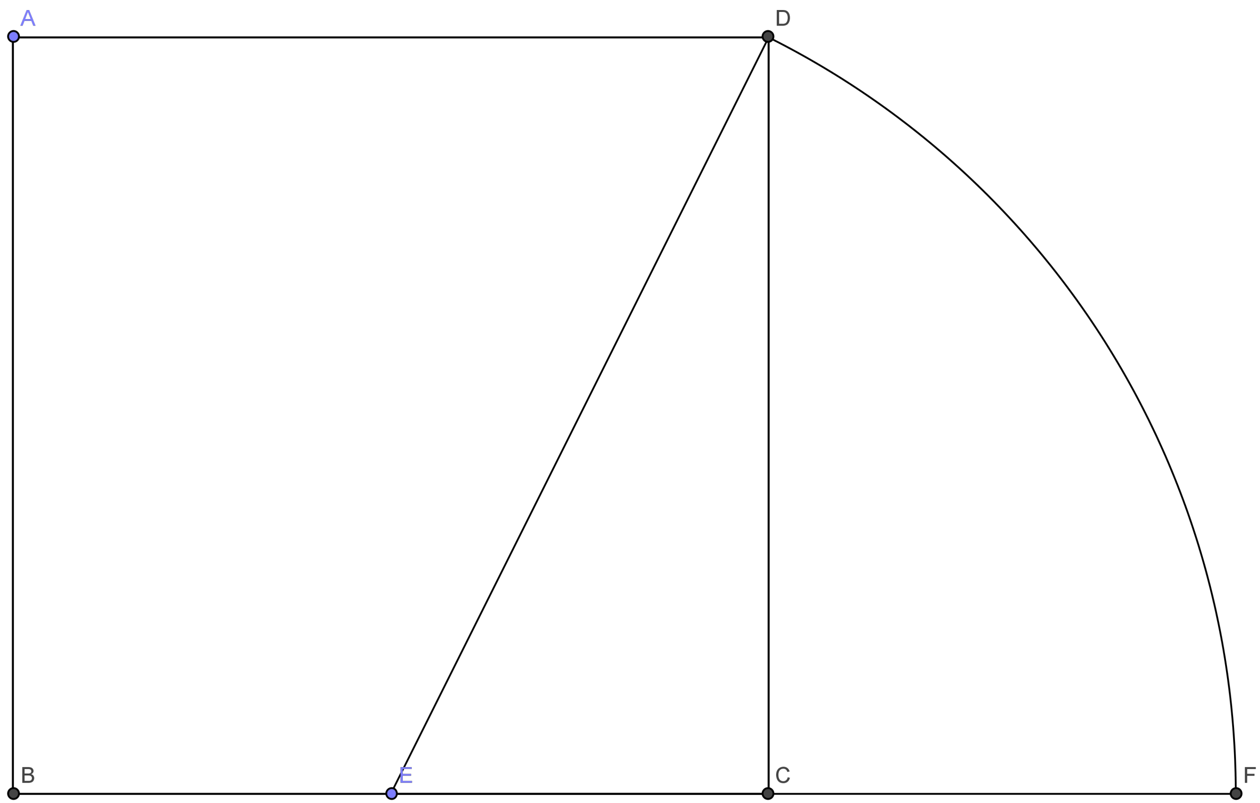
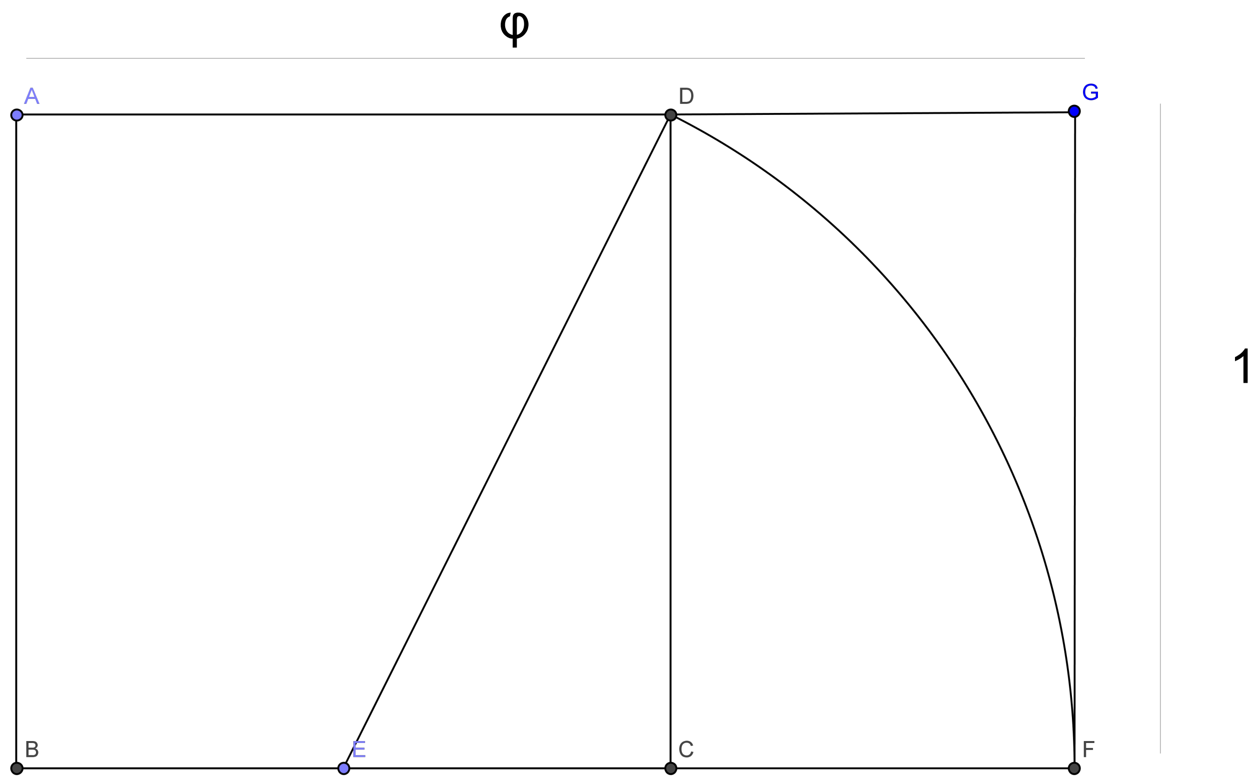

A
D
B
E
C
F

The Golden rectangle



$$EF = ED = \sqrt{EC^2 + DC^2} = \sqrt{\left(\frac{1}{2}\right)^2 + 1^2} = \frac{\sqrt{5}}{2}$$

$$BF = BD + EF = \frac{1}{2} + \frac{\sqrt{5}}{2} = \frac{1+\sqrt{5}}{2} = \varphi$$