The mysterious nature of non-trivial zeros

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Abstract

The absolute values of numbers that are multiplied by various non-trivial zeros are all equal.

Besides this, it is strange that the angle of sin in Euler's formula is always kept at 45^o.

Non-trivial zeros have these property.

The mysterious nature of these non-trivial zeros can only be wondered.

key words
non-trivial zeros, absolute value, the angle of sin in Euler's formula

1 introduction

If s is non-trivial zeros, and a is integer.

$$|a^s| = \sqrt{a} \tag{1}$$

and

$$|a^{2s}| = a \tag{2}$$

if s=1/2+i14.1347
2^s=-1.31715 - 0.514893 i
abs(-1.31715 - 0.514893 i)=1.41421...

if s=1/2+i21.022
$2^s = -0.594904 + 1.28300i$

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abs(-0.594904+1.28300i)=1.41421...

if s=1/2+i25.0109
$2^s = 0.0812375 - 1.41188i$
abs(0.0812375 - 1.41188 i)=1.41422...

if s=1/2+i30.4249
$2^s = -0.876633 + 1.10974i$
abs(-0.876633+1.10974i)=1.41422...

if s=1/2+i32.9351
$2^s = -0.946330 - 1.05093i$
abs(-0.946330-1.05093i)=1.41421...

if s=1/2+i37.5862
$2^s = 0.856728 + 1.12517i$
abs(0.856728+1.12517i)=1.41421...

if s=1/2+i40.9187
$2^s = -1.40870... - 0.124780i$
abs(-1.40870-0.124780i)=1.41421...

if s=1/2+i43.3271
$2^s = 0.262818 - 1.38958i$
abs(0.262818 - 1.38958 i)=1.41422...

if s=1/2+i48.00515
$2^s = -0.401566 + 1.356i$
abs(-0.401566 + 1.356i)=1.41421...

if s=1/2+i49.7738
$2^s = -1.41192 + 0.080496i$
abs(-1.41192 + 0.080496i)=1.41421...

if s=1/2+i52.9703
$2^s = 0.784342... - 1.17678...i$
abs(0.784342 -1.17678i)=1.41421...

if s=1/2+i56.4462
$2^s = 0.203481... + 1.39950...i$
abs(0.203481+1.39950i)=1.41422...

if s=1/2+i59.347
$2^s = -1.35292... - 0.411846...i$
abs(-1.35292 -0.411846i)=1.41422...

if s=1/2+i60.8318

$2^s = -0.344549... - 1.37160...i$
abs(-0.344549 -1.37160i)=1.41421...

if s=1/2+i65.1125
$2^s = 0.577368... + 1.29099...i$
abs(0.577368 +1.29099i)=1.41422...

if s=1/2+i14.1347
$3^s = -1.70425 + 0.30908i$
abs(-1.70425 + 0.30908 i)=1.73205...

if s=1/2+i21.022
$3^s = -0.779658 - 1.54665i$
abs(-0.779658 - 1.54665 i)=1.73205...

if s=1/2+i25.01086
$3^s = -1.21033 + 1.23899i$
abs(-1.21033 + 1.23899 i)=1.73205...

if s=1/2+i30.4249
$3^s = -0.735313 + 1.56822i$
abs(-0.735313 + 1.56822 i)=1.73205...

if s=1/2+i32.9351
$3^s = 0.0945058 - 1.72947i$
abs(0.0945058 - 1.72947 i)=1.73205...

if s=1/2+i37.5862
$3^s = -1.55814 - 0.756433i$
abs(-1.55814 - 0.756433 i)=1.73205...

if s=1/2+i40.9187
$3^s = 0.976998 + 1.4302i$
abs(0.976998 + 1.4302 i)=1.73205...

if s=1/2+i43.3271
$3^s = -1.53967 - 0.793357i$
abs(-1.53967 - 0.793357 i)=1.73205...

if s=1/2+i48.00515
$3^s = -1.35974 + 1.0729i$
abs(-1.35974 + 1.0729 i)=1.73205...

if s=1/2+i49.7738
$3^s = -0.504841 - 1.65685i$
abs(-0.504841 - 1.65685 i)=1.73206...

if s=1/2+i52.9703
$3^s = -0.128674 + 1.72726i$
abs(-0.128674 + 1.72726 i)=1.73205...

if s=1/2+i56.4462
$3^s = 1.18245 - 1.26563i$
abs(1.18245 - 1.26563 i)=1.73205...

if s=1/2+i59.347
$3^s = -1.2385 + 1.21083i$
abs(-1.2385 + 1.21083 i)=1.73205...

if s=1/2+i60.8318
$3^s = -1.13383 - 1.30936i$
abs(-1.13383 - 1.30936 i)=1.73205...

if s=1/2+i65.1125
$3^s = -1.29846 + 1.1463i$
abs(-1.29846 + 1.1463 i)=1.73205...

if s=1/2+i67.0798
$3^s = -0.229229 - 1.71682i$
abs(-0.229229 - 1.71682 i)=1.73206...

if s=1/2+i69.5464
$3^s = 0.926622 + 1.46334i$
abs(0.926622 + 1.46334 i)=1.73205...

if s=1/2+i69.5464
$3^{2s} = -1.28274 + 2.71193i$
abs(-1.28274 + 2.71193 i)=3

2 Discussion

Eq.(3) is Euler's formula and Eq.(4) is Riemann's formula.

$$\zeta(s) = 2^s \pi^{s-1} \sin\left(\frac{s\pi}{2}\right) \Gamma(1-s) \zeta(1-s) \tag{3}$$

$$\xi(s) = \frac{1}{2} s(s-1) \pi^{-s/2} \Gamma\left(\frac{s}{2}\right) \zeta(s) \tag{4}$$

Let's calculate the sin part of equation (3).

$\{\sin(s\pi/2)\}, \{s = 1/2 + i14.1347\} = 1.55232... \times 10^9 + 1.55232... \times 10^9 i$
$\{\sin(s\pi/2)\}, \{s = 1/2 + i21.022\} = 7.75202... \times 10^{13} + 7.75202... \times 10^{13} i$
$\{\sin(s\pi/2)\}, \{s = 1/2 + i25.01086\} = 4.07913... \times 10^{16} + 4.07913... \times 10^{16} i$
$\{\sin(s\pi/2)\}, \{s = 1/2 + i30.4249\} = 2.01355... \times 10^{20} + 2.01355... \times 10^{20} i$
$\{\sin(s\pi/2)\}, \{s = 1/2 + i32.9351\} = 1.03846 \times 10^{22} + 1.03846 \times 10^{22} i$

Thus, it does not change while maintaining the 45^o angle. This is also a mysterious property of the non-trivial zero value.

3 Conclusion

The mysterious nature of these non-trivial zeros is astounding.

4 Postscript

These calculations were performed with WolframAlpha.

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