

# Simple Results of $1/0 = 0/0 = 0$ by Elementary Figures

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May 28, 2024

**Abstract:** In this note, we would like to show the simple results  $1/0 = 0/0 = 0$  based on the elementary figures that are well-known and simple results on the complex plane. The logic and results are all reasonable and exceptionally pleasant lookings for undergraduate students.

David Hilbert:

*The art of doing mathematics consists in finding that special case which contains all the germs of generality.*

Oliver Heaviside:

*Mathematics is an experimental science, and definitions do not come first, but later on.*

**Key Words:** Division by zero, division by zero calculus, complex plane, fractional, similarity of figures, property of zero.

**2010 Mathematics Subject Classification:** 30A10, 30H10, 30H20, 30C40.

## 1 Results

We assume the elementary properties of the division by zero and division by zero calculus. See the basic references cited. However, here, we would like to point out the simple results

$$\frac{1}{0} = \frac{0}{0} = 0,$$

based on the elementary figures that are well-known and simple results on the complex plane.

At first, we assume that  $z_1$  and  $z_2$  are not zero. Then,

$$z = \frac{z_1}{z_2}$$

if and only if

$$\triangle 0z z_1 \sim \triangle 01z_2 \tag{1.1}$$

with the similarity  $\sim$  of triangles.

In this situation, how will it be the case  $z_2 = 0$ ? The fundamental triangle  $\triangle 01z_2$  is  $\triangle 010$ , the degenerate line  $[0, 1]$  and so from the similarity, we have  $\triangle 0z_1 0$  with  $z = 0$ , not  $z = z_1$ . This means that the desired result

$$z = \frac{z_1}{0} = 0.$$

For the case  $z_1 = 0$ ,  $z = 0$  and we have, of course, that

$$z = \frac{0}{z_2} = 0$$

and

$$\triangle 000 \sim \triangle 01z_2.$$

Of course, we have

$$\frac{0}{0} = 0.$$

## Remarks

For any Figure  $F$ ,  $zF$  for

$$z = r \exp i\theta$$

means the similar figure with  $F$  for  $r > 0$ . Thus, we can understand that the point zero for  $z = 0$  is similar to any figure  $F$ . This will mean that it is very interesting property of zero; see [2].

In addition, the author is gathering examples of division by zero and division by zero calculus. This example was numbered as No. 1307 (2024.5.23.14:10).

## References

- [1] H. Okumura, *Geometry and division by zero calculus*, International Journal of Division by Zero Calculus, **1**(2021), 1-36.
- [2] S. Saitoh, *Introduction to the Division by Zero Calculus*, Scientific Research Publishing, Inc. (2021), 202 pages.
- [3] S. Saitoh, *History of Division by Zero and Division by Zero Calculus*, International Journal of Division by Zero Calculus, **1** (2021), 1-38.
- [4] S. Saitoh, *Division by Zero Calculus - History and Development*, Scientific Research Publishing, Inc. (2021.11), 332 pages.