

# A remark of the definition of $0/0 = 0$ by Brahmagupta

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**Abstract.** We consider why Brahmagupta did not refer to  $z/0$  for  $z \neq 0$  but  $0/0 = 0$ .

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Indian mathematician and astronomer Brahmagupta (598-665+?) stated  $0/0 = 0$ , but did not refer to  $z/0$  for  $z \neq 0$ . The purpose of this note is to deduce how he considered on this matter.

We deduce that he considered that division is made by multiplying a number as subtraction is essentially addition. Indeed if  $a \neq 0$ ,

$$z \div a = z \cdot a^{-1}.$$

Therefore in the case  $a = 0$ ,

$$z \div 0 = z \cdot x.$$

for some  $x$ . However he could not specify the number  $x$  in this case. Hence he could not refer to  $z/0$  for any number  $z$ . But the right side always equals 0 if  $z = 0$  for any  $x$ . Thereby he could consider

$$0 \div 0 = 0 \cdot x = 0,$$

which implies  $0/0 = 0$ . This seems to be the reason he only referred to  $0/0 = 0$ .