

# Euclid's Algorithm for HCF

The famous Greek mathematician Euclid came up with an algorithm for finding the HCF of any two numbers  $a$  and  $b$ . It simplifies the task at each step until the HCF is found.

Given two numbers  $a$  and  $b$ , first check if  $b$  is zero. If yes, then the HCF is  $a$ . If no, calculate  $c$ , the remainder after the division of  $a$  by  $b$ . Replace  $a$  with  $b$ ,  $b$  with  $c$ , and start the process again.

Here is an example, finding the HCF of 1071 ( $a$ ) and 1029 ( $b$ ):

$a$	$b$	$c$	
1071	1029	42	← When $1071 \div 1029$ , the remainder is 42
1029	42	21	← When $1029 \div 42$ , the remainder is 21
42	21	0	
21	0		← $b = 0$ , so we stop, and the HCF is $a$ : 21

Try using Euclid's algorithm to find the HCF of these pairs of numbers:

1) 1084 and 768

2) 472 and 712

3) 17 872 and 15684

4) There are 3 common ways to find the HCF of two numbers: writing lists of the factors of each and picking the highest; the venn-diagram method; Euclid's algorithm. Which is better and why?