

Highest Common Factor

This is maths

You know all of it already

Highest Common Factor

A **factor** is a number which divides into a bigger whole number without leaving a remainder

So, 16 has **factors** of 8, 4, 2 and 1

Highest Common Factor

A **common factor** is a number which divides into two or more bigger numbers without leaving a remainder

So the numbers 16 and 20 have common factors of 4, 2 and 1

Highest Common Factor

The **Highest Common Factor** is the biggest number that divides into two or more other numbers without leaving a remainder

So, for the numbers 32 and 20 the Highest Common Factor is 4

Highest Common Factor

Find the highest common factors of

- a. 12 and 6
- b. 14 and 8
- c. 16 and 8
- d. 25 and 20
- e. 64 and 38
- f. 36 and 126
- g. 1024 and 256

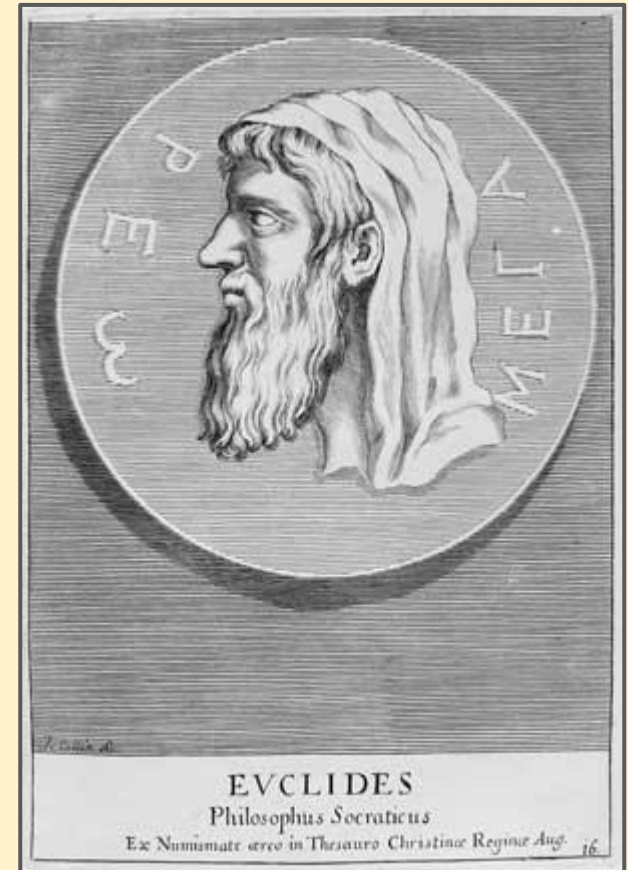
Highest Common Factor

There is an **algorithm** to find the highest common factor of two numbers

It works every time.

Guaranteed

It's a very old algorithm. The first person to write it down was a Greek mathematician called Euclid



Highest Common Factor

WHILE number1 NOT EQUAL TO number2

IF number1 > number2

 number1 = number1 – number2

ELSE

 number2 = number2 – number1

Highest Common Factor

WHILE number1 NOT EQUAL TO number2

IF number1 > number2

number1 = number1 – number2

ELSE

number2 = number2 – number1

So, for 12 and 30:

- number2 is higher so do the ELSE
 $30 - 12 = 18$ so number2 is now 18
- number2 is still higher so ELSE
 $18 - 12 = 6$ so number2 is now 6
- now number1 is higher so do IF
 $12 - 6 = 6$ so number1 is now 6
- numbers are the same, so stop

The numbers are the same, so 6 is the HCF

Highest Common Factor

Try Euclid's algorithm out:

- a. 16 and 4
- b. 25 and 20
- c. 64 and 38
- d. 36 and 126

Highest Common Factor

Euclid's algorithm is really short

It looks like it must be too simple to work, but it does work. Every time

Guaranteed

For **any** two numbers

And we can program it in Python really simply