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

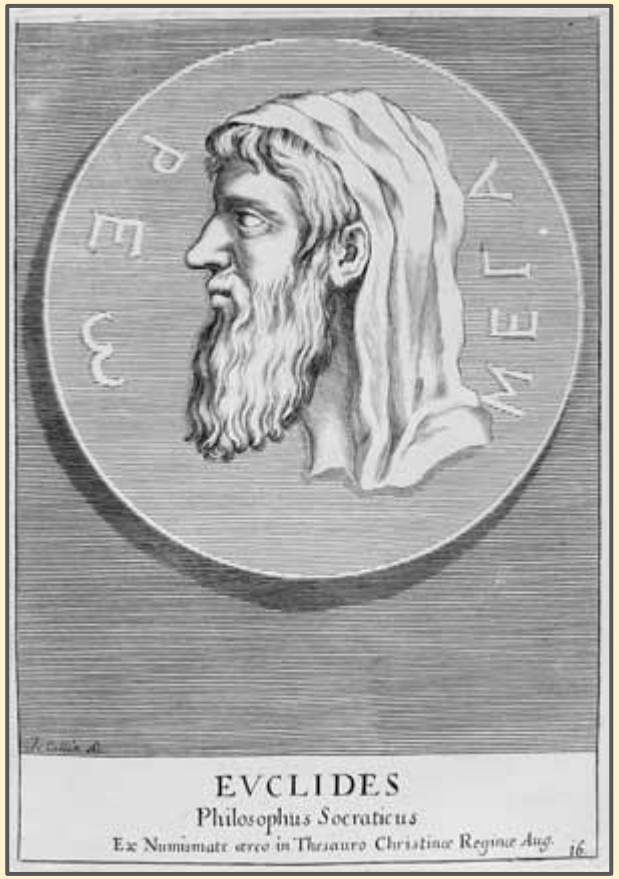
So, for the numbers 32 and 20 the Highest Common Factor is 4

Highest Common Factor

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 man called Euclid



Highest Common Factor

```
WHILE number1 NOT EQUAL TO number2
    IF number1 > number2
        number1 = number1 - number2
    ELSE
        number2 = number2 - number1
```

Highest Common Factor

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```

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