

YEAR 10 — USING NUMBER...

Types of number & sequences

@whisto_maths

What do I need to be able to do?

By the end of this unit you should be able to:

- Understand factors and multiples
- Express numbers as a product of primes
- Find the HCF and LCM
- Describe and continue sequences
- Explore sequences
- Find the n th term of a linear sequence

Keywords

Factor: numbers we multiply together to make another number

Multiple: the result of multiplying a number by an integer

HCF: highest common factor. The biggest factor that numbers share.

LCM: lowest common multiple. The first multiple numbers share.

Arithmetic: a sequence where the difference between the terms is constant

Geometric: a sequence where each term is found by multiplying the previous one by a fixed nonzero number

Sequence: items or numbers put in a pre-decided order

Multiples

The "times table" of a given number

All the numbers in this lists below are multiples of 3.

3, 6, 9, 12, 15...

$3x, 6x, 9x \dots$

This list continues and doesn't end

x could take any value and as the variable is a multiple of 3 the answer will also be a multiple of 3

Non example of a multiple

45 is not a multiple of 3 because it is 3×15

Not an integer

Factors

Arrays can help represent factors

5×2 or 2×5

Factors of 10

1, 2, 5, 10

10×1 or 1×10

Factors and expressions

$x \ x \ x \ x \ x \ x$

$6x \times 1$ OR $6 \times x$

$x \ x$

$x \ x$

$2x \times 3$

$x \ x \ x$

$x \ x \ x$

The number itself is always a factor

Factors of $6x$

$6, x, 1, 6x, 2x, 3, 3x, 2$

Prime numbers

- Integer
- Only has 2 factors
- and itself

The first prime number
The only even prime number

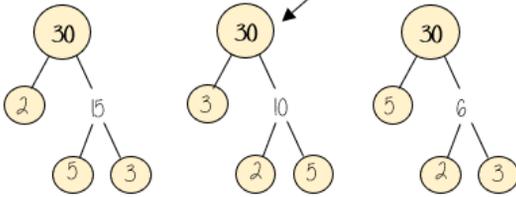
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Learn or how-to quick recall...

2, 3, 5, 7, 11, 13, 17, 19, 23, 29...

Product of prime factors

Multiplication part-whole models



All three prime factor trees represent the same decomposition

$30 = 2 \times 3 \times 5$

Multiplication of prime factors

Using prime factors for predictions

eg 60 30×2 $2 \times 3 \times 5 \times 2$
150 30×5 $2 \times 3 \times 5 \times 5$

Finding the HCF and LCM

HCF — Highest common factor

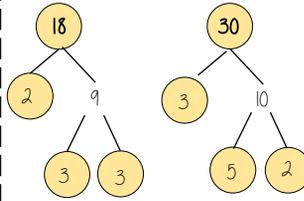
HCF of 18 and 30

18: 1, 2, 3, 6, 9, 18

30: 1, 2, 3, 5, 6, 10, 15, 30

6 is the biggest factor they share

HCF = 6



LCM — Lowest common multiple

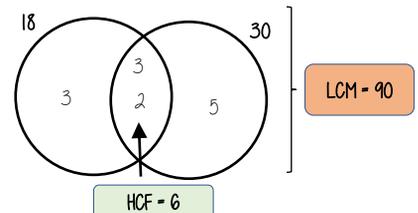
LCM of 18 and 30

18: 18, 36, 54, 72, 90

30: 30, 60, 90

The first time their multiples match

LCM = 90



Arithmetic/ Geometric sequences

Arithmetic Sequences change by a common difference. This is found by addition or subtraction between terms

Geometric Sequences change by a common ratio. This is found by multiplication/ division between terms

Term to term rule — how you get from one term (number in the sequence) to the next term

Position to term rule — take the rule and substitute in a position to find a term. Eg. Multiply the position number by 3 and then add 2

Other sequences

Fibonacci Sequence

1, 1, 2, 3, 5, 8 ...

Each term is the sum of the previous two terms

Triangular Numbers — look at the formation

1, 3, 6, 10, 15 ...

Square Numbers — look at the formation

1, 4, 9, 16 ...

Sequences are the repetition of a pattern

Finding the n th term

This is the 4 times table $\rightarrow 4, 8, 12, 16, 20 \dots$

$4n$

This has the same constant difference — but is 3 more than the original sequence

7, 11, 15, 19, 22

$4n + 3$

This is the constant difference between the terms in the sequence

This is the comparison (difference) between the original and new sequence