USING NUMBER...

Types of number & sequences

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 nth 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

R

All the numbers in this lists below are multiples of 3

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

This list continues and doesn't end

3x, 6x, 9x ...

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

4.5 is not a multiple of 3 because it is 3 x 1.5

Not an integer

Factors

R

Arrays can help represent factors

5 x 2 or 2 x 5

Factors of 10
1, 2, 5, 10

10 x 1 or 1 x 10

The number itself is always a factor

Factors and expressions

x x x x x x

6x × 1 OR 6 × x

Factors of 6x
6, x, 1 6x, 2x, 3, 3x, 2

x x x x x x

2x × 3

x x x x x x

3x × 2

Prime numbers

2

- Integer
- Only has 2 factors
- and itself

The first prime number
The only even prime number

Learn or how-to quick recall...

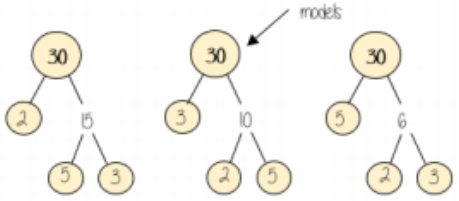
2, 3, 5, 7, 11, 13, 17, 19, 23, 29...

R

Product of prime factors

R

Multiplication part-whole models



All three prime factor trees represent the same decomposition

30 = 2 x 3 x 5 ← Multiplication of prime factors

Using prime factors for predictions

eg 60 30 x 2 2 x 3 x 5 x 2
150 30 x 5 2 x 3 x 5 x 5

Finding the HCF and LCM

R

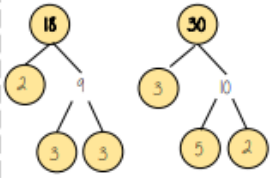
HCF – Highest common factor

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



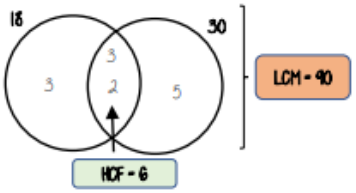
LCM – Lowest common multiple

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 my 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. E.g. 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 nth term

R

This is the 4 times table → 4, 8, 12, 16, 20....

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