

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

Non example of a multiple

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

Not an integer

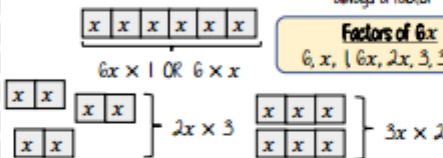
x could take any value and as the variable is a multiple of 3 the answer will also be a multiple of 3

Factors

Arrays can help represent factors

Factors of 10: $1, 2, 5, 10$

Factors and expressions



Prime numbers

- Integer
- Only has 2 factors
- and itself

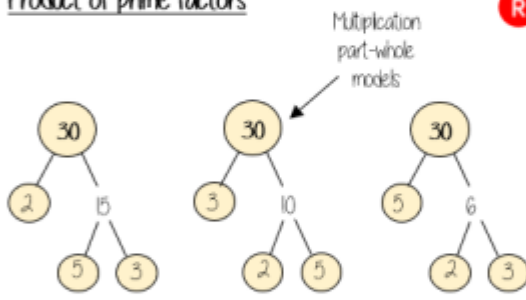
The first prime number
The only even prime number

2

Learn or how-to quick recall...

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

Product of prime factors



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

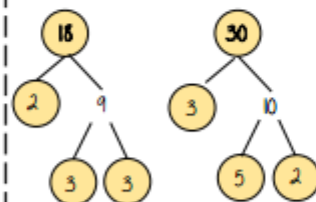
HCF of 18 and 30

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

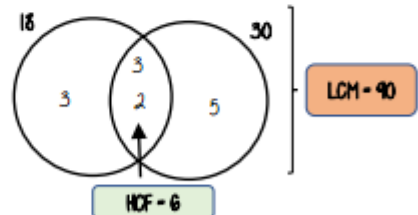
LCM of 18 and 30

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 → 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