Z — The Integers

The infinite set of all integers combined with addition. Source: [1]

Z/nZ — The Integers Modulo n

The integers between 0 and positive integer n, including 0 but not including n, paired with addition

Also known as $Z/(n)$, or Z/n. Source: [2]

Z_n — The Integers Modulo n (in Group Theory)

Note: "Instead of the quotient notations Z/nZ... some authors denote a finite cyclic group as Z_n, but this conflicts with the notation of number theory, where Z_p denotes a p-adic number ring, or localization at a prime ideal." Source: [2]. Most of the group theory articles I was reading denoted a finite cyclic group as Z_n instead of Z/nZ.

C — Cyclic group

"A cyclic group... is a group that is generated by a single element."

"Every infinite cyclic group is isomorphic to the additive group of Z, the integers." Sources: [1, 2]

C_n — Cyclic group of degree/order n

"Some authors [such as in source [3]] denote a finite cyclic group as Z_n." This is because "Every finite cyclic group of order n is isomorphic to the additive group of Z/nZ, the integers modulo n, which is sometimes described using Z_n." Sources: [1, 2].

S — Symmetric Group

"The symmetric group defined over any set is the group whose elements are all the bijections from the set to itself, and whose group operation is the composition of functions." Source: [4]

S_n — Finite Symmetric Group

"The finite symmetric group S_n defined over a finite set of n symbols consists of the permutations that can be performed on the n symbols." [4]

"The order (number of elements) of the symmetric group S_n is $n!$." [4]. Also, "every group G is isomorphic to a subgroup of the symmetric group on (the underlying set of) G." [4]

Two other resources I found helpful, see [5].

A_n — Alternating Group

"The alternating group is a group containing only even permutations of the symmetric group....

"It turns out that half the permutations of the symmetric group are even and the other half are odd. That is if we permute a set with 'n' elements the symmetric group has !n permutations and the alternating group has !n/2 permutations." Source: [6], which also has a great explanation of even versus odd elements. Also, source [7] can be useful.

D_n — Dihedral Group

"In mathematics, a dihedral group is the group of symmetries of a regular polygon, which includes rotations and reflections." The number of sides of the polygon in question determines the subscript; for example, D_4 would contain the symmetries of a square.

Also known as Dih_n. Sources: [8,9]

Sources:

[1] "Normal Subgroup," *Wikipedia*, Retrieved 11/28/2020

[2] "Cyclic group," *Wikipedia*, Retrieved 11/28/2020

[3] "List of finite simple groups," *Wikipedia*, Retrieved 11/28/2020

[4] "Symmetric group," *Wikipedia*, Retrieved 12/5/2020

[5] The first five minutes of "Group theory and why I love 808,017...," by 3Blue1Brown, Retrieved 12/5/2020

Also, "Maths - Symmetric Groups," *Euclidean Space*, Retrieved 12/5/2020

[6] "Maths - Alternating Groups," *Euclidean Space*, Retrieved 12/5/2020

[7] "Alternating group," *Wikipedia*, Retrieved 12/5/2020

[8] "Dihedral group," *Wikipedia*, Retrieved 12/5/2020

[9] "Maths - Dihedral Groups," *Euclidean Space*, Retrieved 12/5/2020