

The Cardinality of a Set

The cardinality of a set is the number of elements in the set. If we have a set $A=\{2,3,5,7,11,13,17,19\}$, then the cardinality of set A is 8 and we write $n(A)=8$. [An alternative symbolism for the cardinality of set A is to write $|A|$, but this is easily confused with the use of the vertical bars for absolute value. We will stay with the $n(A)$ symbolism.] For the following sets:

$$B=\{6,2,4,11,9\}$$

$$D=\{4,8,12,16,\dots,44,48,52\}$$

$E=\{x \mid x>5 \text{ and } x<49 \text{ and } x \text{ is a whole number and the written form of } x \text{ contains the digit } 1\}$

$$F=\{1,3,5,7\}$$

we have

$$n(B) = 5$$

$$n(D) = 13$$

$$n(E) = 13$$

$$n(F) = 4$$

$$n(B \cap F) = 0$$

Remember that something is either in a set or it is not in the set and that we do not have multiple instances of an element in a set. Thus, if we were to write $G=\{1,3,4,5,3,2,3,8\}$ we would be misleading the reader because that set should have been written as $G=\{1,3,4,5,2,8\}$. In particular, $n(G)$ is 6. [As usual, the order of the element in a set is immaterial, although it helps readers if we do organize the set members as is $G=\{1,2,3,4,5,8\}$.]

Note that using the sets above $n(D)=n(E)$. When two sets have the same cardinality we say that they have equinumerosity.