Homework 6: pp.71-3, 2;3;4

Answers

(2) The set can be denoted $\{10^1, 10^2, 10^3, 10^4, \ldots\}$

Then put this set into 1-to-1 correspondence with N.

0	10^1
1	10^2
2	10^3
3	10^4
4	10^5
.	.
.	.
.	.

F: N$\rightarrow$D is defined by $F(x) = 10^{(x+1)}$

(3) Call the set of negative integers -Z.

To show that a set is infinite, you must put it in 1:1 correspondence with a proper subset of itself.

Take the proper subset S of -Z, s.t. S = -Z – {-1}

-1	-2
-2	-3
-3	-4
-4	-5
-5	-6
…	…

F:-Z $\rightarrow$ S is defined by F(x) = x-1

(4) The cardinality is $\aleph_0$.

A 1-to-1 correspondence between the set of all sentences of English and the natural numbers could be established as follows:

first arrange all the sentences into groups according to the number of symbols in their written form, and order these groups linearly starting with the group of the shortest sentences.

Within each group, arrange the sentences alphabetically (using some arbitrary convention for the punctuation marks and space).

This procedure puts all the sentences into a single linear order, and thus establishes a 1-to-1 correspondence between the sentences and N.