§3.j   Cardinality

[22B]

Proposition 3.j.1. *[1Z9]*

In the following, let $E_0 = \varnothing$, and let $E_n = \{1, \dots n\}$ otherwise if $n \geq 1$.

Lemma 3.j.2. *[2GK]*

Definition 3.j.3. *[1B1]*

Note that the null map $f : \varnothing \to \varnothing$ is a bigection; and $|A| = 0 \Leftrightarrow A = \varnothing$. The following exercise is a fundamental result.

Exercise 3.j.4. *[2GH]*

We recall Theorem 1.12.2 of the notes [3], for convenience.

Theorem 3.j.5. *[02S]*

Definition 3.j.6. *[2DD]*

§3.j.a   Finite sets

Exercises

E3.j.7 [02T]

E3.j.8 [02W]

E3.j.9 [02Y]

E3.j.10 [22K]

§3.j.b   Comparison

Exercises

E3.j.11 [030]

E3.j.12 [031]

E3.j.13 [032]

E3.j.14 [034]

E3.j.15 [036]

E3.j.16 [038]

E3.j.17 [03C]

E3.j.18 [03F]

§3.j.c   Countable cardinality

Definition 3.j.19. *[2DF]*

Exercises

E3.j.20 [03H]

E3.j.21 [03M]

E3.j.22 [03P]

E3.j.23 [03R]

§3.j.d   Cardinality of the continuum

Definition 3.j.24. *[03V]*

Remark 3.j.25. *[2F2]*

  [[03W]]

Exercises

E3.j.26 [03X]

E3.j.27 [03Y]

E3.j.28 [040]

E3.j.29 [043]

E3.j.30 [045]

§3.j.e   In general

Let's add some more general exercises.

Exercises

E3.j.31 [048]

E3.j.32 [04B]

E3.j.33 [04D]

E3.j.34 [04G]

E3.j.35 [04J]

E3.j.36 [22M]

E3.j.37 [04M]

E3.j.38 [04P]

E3.j.39 [04R]

E3.j.40 [04V]

E3.j.41 [04X]

E3.j.42 [04Z]

Remark 3.j.43. *[27H]*

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Exercises

E3.j.44 [051]

E3.j.45 [053]

E3.j.46 [055]

E3.j.47 [057]

Other interesting exercises are [OT9], [OMZ].

QuasiEsercizio 13. *[1ZB]*

QuasiEsercizio 14. *[05B]*

QuasiEsercizio 15. *[05C]*

QuasiEsercizio 16. *[05F]*

QuasiEsercizio 17. *[05G]*

§3.j.f   Power

Recall that A^B is the set of all functions $f : B \to A$. We will write $|2^A|$ to indicate the cardinality of the set of parts of A.

Exercises

E3.j.48 [05J]

E3.j.49 [05M]

In general in case $|B| > |A|$ the study of the cardinality of $|B^A|$ is very complex (even in seemingly simple cases like $A = \mathbb{N}$).

[[05Q]]

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