Problems and Comments for Section 6

Problems: 6.1, 6.2, 6.5, 6.8

Comments: In mathematics everything should be a set. An ordered pair \((a, b)\) is not a set. It should be something different from the set consisting of \(a\) and \(b\). We have \(\langle a, b \rangle = \langle b, a \rangle\) but \((a, b) \neq (b, a)\) unless \(a = b\). The Kuratowski definition of an ordered pair is:

\[
(a, b) = \{\{a\}, \{a, b\}\}
\]

You may try to prove the following

**Proposition** \((a, b) = (c, d)\) if and only if \(a = c\) and \(b = d\).

Notice that in Kuratowski’s definition of an ordered pair \((a, b)\), the first component is the only element of the singleton \(\{a\}\) in \((a, b)\) while the second component is either also \(a\) or the element \(b\) in \(\{a, b\}\) if \(b\) is different from \(a\).