Homework 1

Discrete Mathematics

Due: September 12, 2019

1. Problemas

PROBLEM 1. *a) Show that $PA = PB$ if and only if $A = B$.*
b)Give an example of sets A and B such that $\bigcup A = \bigcup B$ but $A \neq B$.

PROBLEM 2. *Let A and B be sets.*

(i) Show that $\mathcal{P}A \bigcap \mathcal{P}B = \mathcal{P}(A \bigcap B)$.
(ii) Show that $\mathcal{P}A \bigcup \mathcal{P}B \subset \mathcal{P}(A \bigcup B)$. ¿When do we have equality?

PROBLEM 3. *Show that if $a \in B$ then $\mathcal{P}a \in \mathcal{P}\mathcal{P} \bigcup B$*

PROBLEM 4. *Are the sets $A \cup \bigcup B$ and $\bigcup\{A \cup X | X \in B\}$ equal? If not , under which conditions does equality hold?*

PROBLEM 5. *Show that if a is transitive then a^+ is also transitive.*

PROBLEM 6. *Show that if a is transitive then $\bigcup a$ is also transitive.*

PROBLEM 7. *Show that if $\mathcal{P}a$ is transitive then a is also transitive.*

PROBLEM 8. *Regularity axiom. Every nonempty set A has a member m with $m \cap A = \emptyset$.*
Show that the Regularity axiom implies that $a \notin a$.