HOMEWORK #2

Problem 1. Consider the partition

$$\mathcal{P} = \big\{\{1,3,6,7,8,9\},\{2,5\},\{4\},\{10\}\big\}.$$

Let $\sim$ be the associated equivalence relation.

(a) What is $\overline{2}$?
(b) Is it true that $7 \sim 4$?
(c) List 4 elements of A so that $a \not\sim b$ for any distict a and b in your list.

Problem 2. The following table describes an equivalence relation. Find the associated set of ordered pairs that is this relation.

$\sim$	1	2	3	4	5	6
1	$*$		$*$			
2		$*$				
3	$*$		$*$			
4				$*$	$*$	$*$
5				$*$	$*$	$*$
6				$*$	$*$	$*$

Problem 3. There are 5 equivalence relations on the set $\{0,1,2\}$. Find them all.

Problem 4. Here is a partition of $\mathbb{N}$ into a bunch of finite sets:

$$\big\{\{1\},\{2,3\},\{4,5,6,7\},\{8,9,10,11,12,13,14,15\},\ldots\big\}$$

(Each subset is twice as big as the one before, and contains consecutive integers.) Let $\sim$ be associated equivalence relation.

(a) What is $\overline{1}$?
(b) What is $\overline{11}$?
(c) Is $4 \sim 4$?
(d) Is $9 \sim 100$?
(e) What is $\overline{5} \cap \overline{2}$?
(f) What is $\overline{5} \cap \overline{6}$?
(g)

Problem 5. Give an example of a relation on three elements that is reflexive, symmetric and antisymmetric.