Names:________________________

Solutions are to be written on the board.

1. Let \( A = \{0, 1\} \). Determine all the relations on \( A \). How many should there be?

2. Which of the relations from problem 1 are:
   (a) reflexive?
   (b) symmetric?
   (c) antisymmetric?
   (d) transitive?

3. Which of the relations from Problem 1 are equivalence relations? Justify your answers.

4. Which of the relations from Problem 1 are partial orders? Justify your answers.

5. Let \( A = \{1, 2, 3, 4\} \). Give an example (with justification!) of a relation on \( A \) that is:
   (a) reflexive and symmetric, but not transitive.
   (b) reflexive and transitive, but not symmetric.
   (c) symmetric and transitive, but not reflexive.
   (d) reflexive, but neither symmetric nor transitive.
   (e) symmetric, but neither reflexive nor transitive.
   (f) transitive, but neither reflexive nor symmetric.

6. Let \( A = \{1, 2, 3, 4\} \). Give an example (with justification!) of a relation on \( A \) that is:
   (a) symmetric and antisymmetric.
   (b) neither symmetric nor antisymmetric.

7. Replace “symmetric” by “antisymmetric” in Problem 5. How do your answers change?