

CISC-102 FALL 2019

HOMEWORK 5

Assignments will **not** be collected for grading.

READINGS

Read sections 2.1, 2.2, 2.3, of *Schaum's Outline of Discrete Mathematics*.

PROBLEMS

- (1) Consider the following relations on the set $A = \{1, 2, 3\}$:
 - $R = \{(1, 1), (1, 2), (1, 3), (3, 3)\}$,
 - $S = \{(1, 1), (1, 2), (2, 1), (2, 2), (3, 3)\}$,
 - $T = \{(1, 1), (1, 2), (2, 2), (2, 3)\}$,
 - $A \times A$.For each of these relations determine whether it is symmetric, antisymmetric, reflexive, or transitive.
- (2) Explain why each of the following binary relations on the set $S = \{1, 2, 3\}$ is or is not an equivalence relation on S .
 - (a) $R = \{(1, 1), (1, 2), (3, 2), (3, 3), (2, 3), (2, 1)\}$
 - (b) $R = \{(1, 1), (2, 2), (3, 3), (2, 1), (1, 2), (3, 2), (2, 3), (3, 1), (1, 3)\}$
 - (c) $R = \{(1, 1), (2, 2), (3, 3), (3, 1), (1, 3)\}$
- (3) Let R be a relation on the set of Natural numbers such that $(a, b) \in R$ if $a \geq b$. Show that the relation R on \mathbb{N} is a partial order.
- (4) Which of the following relations on the set $S = \{1, 2, 3, 4, 5, 6\}$ is a function?
 - $R = \{(1,1), (2,2), (3,2), (4,2), (5,3), (6,3)\}$
 - $S = \{(1,1), (2,2), (3,2), (4,2), (5,3), (6,3), (1,4)\}$
 - $T = \{(1,1), (2,2), (3,3), (4,4)\}$
 - $S \times S$