

CSE 16

Homework Assignment 9

Do the following problems from *Book of Proof*:

Chapter 11:

(11.1) 2, 4, 6, 8, 10

(11.2) 2, 4, 6, 12, 14, 16

(11.3) 2, 4, 6, 8, 10, 12

(11.4) 2, 6

(11.5) 2, 4, 6

Additional Problems:

1. Let A be a set with n elements: $|A| = n$.
 - a. How many relations on A are there?
 - b. How many relations on A are reflexive?
 - c. How many relations on A are symmetric?
 - d. How many relations on A are both reflexive and symmetric?
2. (This is a slight re-wording of 11.3 # 16)
Let $A = \{ (a, b) \mid a, b \in \mathbb{Z} \text{ and } b \neq 0 \}$. Define a relation $R \subseteq A \times A$ on A by

$$(a, b)R(c, d) \text{ iff } ad = bc.$$

In other words

$$R = \{ ((a, b), (c, d)) \mid a, b, c, d \in \mathbb{Z} \text{ and } b \neq 0, d \neq 0, ad = bc \}$$

Prove that R is an equivalence relation.