

CSE 16

Homework Assignment 7

Do the following problems from *Book of Proof*:

Chapter 10 (page 195): 26, 28, 32, 42

Chapter 3:

(3.10): 9 (Prove this by induction on n , and note this problem was discussed [here](#).)

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

Additional Problems:

1. Let A be a finite set with $|A| = n$.
 - (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 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.