Math 341 Homework 9

Theo Koss

October 2020

1 Practice problems

2 Problem 9.1

Give 3 examples of nonequivalence relations

1. Let $S = Z$ and $R(x, y) =$ "$x < y$". This is not an equivalence relation because it is not symmetric, because $x < y$ does not imply $x > y$.

2. Let $S = Z$ and $R(x, y) =$ "$x > y$". This is not an equivalence relation because it is not symmetric, because $x > y$ does not imply $x < y$.

3. Let $S = Z$ and $R(x, y) =$ "x is a child of y". This is not an equivalence relation because it is not reflexive, because if $x =$ me, I am not a child of myself.

3 Problem 9.8

Find $6^{2020} + 8^{2019} \mod 7$.
Since $6 \equiv -1 \mod 7$ and $8 \equiv 1 \mod 7$: $6^{2020} + 8^{2019} \equiv -1^{2020} + 1^{2019} \mod 7$. And since 2020 is even, $-1^{2020} = 1$. And obviously, $1^{2019} = 1$. So $6^{2020} + 8^{2019} \equiv 1 + 1 = 2 \mod 7$.