CSCI 301 - Assignment 5, Fall 2024

Your name here

Modify the .tex source file for this document, adding your answers below each question. This is an individual assignment. See the syllabus for the collaboration policy.

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1. (10 points) Let the relation R on $\mathbb{Z}$ be defined as $R = \{(x, y) : 3 \mid (x + 2y)\}$.

   (a) (6 points) Prove that R is an equivalence relation.

   (b) (4 points) Define each of R's equivalence classes using set-builder notation.

2. (10 points) Consider the function $\theta : \{0, 1\} \times \mathbb{N} \to \mathbb{Z}$, defined as $\theta(a, b) = a - 2ab + b$.

   (a) (5 points) Prove or disprove that θ is surjective.

   (b) (5 points) Prove or disprove that θ is injective.