

Math 421 Problem Set
August 25, 2022

1. Problems 1.1.1, 1.1.2 from D+F.
2. Determine whether X along with the given binary operation $*$ is a group. If it is a group, show that all of the group axioms hold. If not, give a counterexample for one of the axioms.
 - (a) X is the set of functions from \mathbb{R} to \mathbb{R} , and define $f * g = f \cdot g$ (multiplication).
 - (b) X is the set of functions from \mathbb{R} to \mathbb{R} , and define $f * g = f \circ g$.
 - (c) $X = \mathbb{R}_+$ and $a * b = \sqrt{ab}$.
 - (d) $X = \{a/b \mid a \in \mathbb{Z} \text{ and } b \in \{1, 2\}\}$ and define $x * y = x + y$.