MATH 300: Problem Set # 4

Due on: Aug 6, 2014

Problem 1   *Velleman Problems*

- pp. 153-154 # 2,3,7

- pp. 161 # 1,6,7,8

- pp. 170-171 # 3,7,9

- pp. 178-179 # 2,3,5,6,9

- pp. 222-225 # 2,4,8,13,18,19,20,21

- pp. 199-202 # 2,3,5,7,9,13,15,16

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Problem 2   *Properties of Relations*

For each of the following provide an example of a set A and a relation R on A satisfying the given properties

(a) not reflexive, not symmetric, not transitive

(b) not reflexive, not symmetric, transitive

(c) not reflexive, symmetric, not transitive

(d) not reflexive, symmetric, transitive

(e) reflexive, not symmetric, not transitive

(f) reflexive, not symmetric, transitive

(g) reflexive, symmetric, not transitive

(h) reflexive, symmetric, transitive

. . . .

Problem 3   *A Number Problem*

Suppose that S is a subset of $\mathbb{R}$ satisfying the following two properties.

- $0, 1 \in S$

- the mean of every finite subset of S is contained in S

Prove that S contains all rational numbers between 0 and 1.

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Problem 4   *A Puzzle*

Prove that every set of ten distinct numbers between 1 and 100 contains two disjoint nonempty subsets with the same sum.

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