Assignment 14 (11/3)

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Problem 1

Problems 3.2.$(15, 16, 20)$.

Problem 2

Problems 3.2.$(23, 30)$.

Problem 3

Problems 3.2.$(33, 37, 43, 44)$.

Problem 4

Problems 3.2.$(50, 52, 62, 63, 64)$.

Problem 5

Problems 3.3.$(39, 40)$.

Problem 6

Let a function $f : \mathbb{R} \to \mathbb{R}$ satisfy the equation

$$f(x + y) = f(x) + f(y)$$

for all $x, y \in \mathbb{R}$. Prove that

1. if f is continuous at $x = 0$, then it is continuous for all $x \in \mathbb{R}$.

2. If f is differentiable everywhere then $f(x) = xf(1)$ for all $x \in \mathbb{R}$.