# Numerical Analysis Homework 1

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## 1 Section 1.1

### 1.1 #10

## 2 Section 1.2

### 2.1

## 3

## 4 Problem 3

Find two distinct 3-decimal digit floats in $[1, 100]$, say $a$ and $b$, such that $a < b$, so that $fl(fl(a + b)/2)$ is not in the interval $[a, b]$. Now with these values of $a$ and $b$, find $fl(a + fl(fl(b - a)/2))$

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Let $a = 0.101 * 10^1$ and $b = 0.102 * 10^1$. Then $fl(a + b) = 0.103 * 10^1$, and $fl(fl(a + b)/2) = 0.515 * 10^0$. Note that $0.515 * 10^0$ is not in $[a, b]$.
Now to compute $fl(a + fl(fl(b - a)/2))$.
$fl(a + fl(fl((0.102 * 10^1) - (0.101 * 10^1))/2))$
$= fl(a + fl(fl(0.001 * 10^1)/2))$
$= fl(a + fl(0.1 * 10^{-1}/2))$
$= fl(a + fl(0.05 * 10^{-1}))$
$= fl(a + 0.5 * 10^{-2})$
$= fl((0.101 * 10^1) + (0.5 * 10^{-2}))$
$= fl((0.101 * 10^1) + (0.5 * 10^{-2}))$
$= fl(1.015)$
$= 0.101 * 10^1$