MATH 140A – MOCK MIDTERM 1

Instructions: This is a practice exam, which should give you a good idea of the length and difficulty of the actual exam. It is a **VERY BAD** idea to *just* study this practice exam, as the actual exam might (and will) have very different questions. Please also look at the study guide, homework, and the lecture notes/videos for a full study experience.

1		10
2		10
3		10
4		10
Total		40

Date: Friday, April 24, 2020.

1. *(10 points)* Let A and B be two nonempty bounded subsets of $\mathbb{R}$, show that

$$\sup(A + B) = \sup(A) + \sup(B)$$

2. *(10 points)* Show directly, using the definition of a limit, that if (s_n) is a sequence converging to $s \neq 0$, then $(s_n)^2$ converges to s^2.

3. *(10 points)* Prove by contradiction that $\sup(B) = \infty$, where

$$B = \{2^n \mid n \in \mathbb{N}\}$$

Hint: The quantity $\frac{M}{2}$ might be useful here.

4. *(10 points)* Show directly, using the definition of a limit, that

$$\lim_{n \to \infty} 3^n = \infty$$