Problem Set 7 **Foundations** **Due 3/21/22**

Four of these problems will be graded (my choice, not yours!), with each problem worth 5 points. Clear and complete justification is required for full credit. You are welcome to discuss these problems with anyone and everyone, but must write up your own final submission without reference to any sources other than the textbook and instructor. Submit as a pdf on Moodle or on paper.

1. If $f : \mathbb{R} \to \mathbb{R}$ and $g : \mathbb{R} \to \mathbb{R}$ are surjective functions, then $f + g$ is surjective.

2. If $f : A \to B$ and $g : B \to C$ are injective functions, then $g \circ f$ is injective.

3. If $f : A \to B$ and $g : B \to C$ are surjective functions, then $g \circ f$ is surjective.

4. If $f : A \to B$ has an inverse function g, then g has f as an inverse function also.

5. Let $f : A \to B$ be a bijective function. Then there exists an inverse function g for f.

6. Let $f : A \to B$ be a bijective function. Then the inverse function of f is unique, i.e. if g_1 and g_2 are both inverse functions for f, then $g_1 = g_2$.

7. Let $f : A \to B$ be an invertible function. Then f is bijective.

8. Do the InverseFunctions assignment on WeBWorK, available via

   http://http://crlinwebwork2.coe.edu/webwork2/MTH-215/InverseFunctions/

9. Explain clearly the domain issue with your answer to the last problem on the InverseFunctions WeBWorK assignment.

10. Critique the following proof of the proposition that all functions are bounded: Take $x \in \mathbb{R}$. Then since $|f(x)| + 1 > |f(x)|$, then we can take $M = |f(x)| + 1$ as a bound for f.