Math 55 Section 101 Quiz 2

Problem 1 True or False? If true, justify/prove your answer. If false, give a counter-example. All functions are between real numbers, $\mathbb{R} \to \mathbb{R}$.

1.A (2 pts) $f(x) = x^2 + 1$ is injective.

1.B (2 pts) $g(x) = x^4 - 100$ is surjective.

1.C (2 pts) $h(x) = -2x + 5$ is bijective.

1.D (2 pts) A polynomial function $p(x)$ is called *nth order* if the highest power of x that it contains is x^n. For example, $2x^2 + 5$ is 2nd order and $10x^7 + 2x^2 + 1$ is 7th order. True or False: If a polynomial function is $\geq$ 2nd order (that is, 2nd order or higher) then it is *not* injective?

Problem 2 (1 pt) (1.8 Q 29) Prove that there is no integer n such that $n^3 + n^2 = 100$.

Problem 3 (1 pt) Describe a bijection between $\mathbb{Z}^+ := \{x \in \mathbb{Z} | x > 0\}$ (positive integers) and $\mathbb{Z}$.