Written Assignment 2: Due Wednesday, September 17

Problem 1: Consider the function $f \colon \mathbb{Z} \to \mathbb{Z}^2$ given by $f(n) = (3n^2 - 77, 5n + 6)$.
a. Is f injective? Justify your answer carefully.
b. Is f surjective? Justify your answer carefully.

Problem 2: Suppose that A, B, and C are sets and that both $f \colon A \to B$ and $g \colon B \to C$ are surjective functions. Show that the function $g \circ f \colon A \to C$ is surjective.

Problem 3: Suppose that we have a function $f \colon \mathbb{R} \to \mathbb{R}$ with the property that $f(x \cdot y) = f(x) \cdot f(y)$ for all $x, y \in \mathbb{R}$. Suppose that $f(2) = 5$ and $f(3) = 7$. What is $f(\frac{1}{6})$? Explain.
Hint: What can you say about $f(1)$?