A select number of these questions will be graded.

You are allowed to discuss with your classmates, but you must write your own solutions. You must list the names of people you have discussed with and the references you have used (except the materials available from the course website).

Keep in mind that writing is also a component in the problems sets. Try to write in clean and precise mathematical terms. Trying to imitate the style of proofs in the textbook or the notes would help in the beginning. Tex is not required for the problem sets.


(1) Ross 18.4
(2) Ross 18.9
(3) A function $f : S \rightarrow T$ is injective if $f(x) \neq f(y)$ for any $x, y \in S$ and $x \neq y$. A function $f : S \rightarrow T$ is surjective if any $y \in T$, there exists at least one $x \in S$ such that $f(x) = y$. A bijection is a function that is both injective and surjective.

We proved in class that a continuous function $f : [0, 1] \rightarrow [0, 1]$ has a fixed point. Give an example of a (necessarily not continuous) function $g : [0, 1] \rightarrow [0, 1]$ that is a bijection with no fixed point. Give an example of a continuous function $h : (0, 1) \rightarrow (0, 1)$ that is a bijection with no fixed point.

(4) (20 pt) Ross 19.1(a)(c)(d)(f)
(5) Ross 19.2(b)
(6) Ross 19.3(b)
(7) Ross 19.6(b)
(8) Ross 19.7
(9) Ross 19.9(b)(c)