Math 331 Homework Tips

Working in Groups

It is good to work in groups on your homework. It is bad to write your homework solutions in groups. Try this: Get together at a common place and work on the homework. Take quick notes and write some ideas down. Then go home and do a neat write-up by yourself. If you find yourself blindly copying at anytime, then you're doing it wrong! Moreover, if you find someone blindly copying off of you, be proactive! Take your paper from them, erase the board, and *teach* them the solution. This way you will learn something too!

Scratch Work

When trying to solve a difficult problem, one needs scratch work. When working on the homework problems, you should essentially do the homework *twice*. The first time you should do a "quick-and-dirty" version of your homework. Then you should **rewrite** your homework as a neat, understandable, write-up.

Writing Tips

Here is a question in our text, followed by two solutions. The first is poorly written while the second is written well:

1 (1.3.2) Prove that $f : \mathbb{R} \to \mathbb{R}$ by $f(s) = \sqrt[3]{s^3 + 1}$ is injective.

Poorly Written Solution

$$\sqrt[3]{s_1^3 + 1} = \sqrt[3]{s_2^3 + 1} \to s_1^3 + 1 = s_2^3 + 1 \to s_1^3 = s_2^3 \to s_1 = s_2$$

Well Written Solution

Proof Suppose that there exists s_1 and s_2 such that

$$f(s_1) = f(s_2).$$

We must show that $s_1 = s_2$. First note

$$\sqrt[3]{s_1^3 + 1} = \sqrt[3]{s_2^3 + 1} \Rightarrow s_1^3 + 1 = s_2^3 + 1$$

as we merely take the cube root of both sides. Subtracting 1 from both of the equations we see

$$s_1^3 = s_2^3.$$

Again taking cube roots, we conclude that $s_1 = s_2$. This proves that f is injective. ■

Points to Notice

- Use appropriate mathematical notation. If you mean $\mathbb{R}$, don't write R, likewise with $\varnothing$ and 0. Also, $\rightarrow$ should never replace $=$, which means *equals*. The symbol $\rightarrow$ should also never replace $\Rightarrow$, which means *implies*.

- Write in complete thoughts. The "Poorly Written Solution" is basically a jumble of symbols, not a complete thought. Compare it to the "Well Written Solution."

- Tell me what's going on. When you start a proof, write "Proof." When you finish a proof, let me know. If f is a function, tell me; and so on.