Revenge Homework

This HW has no analysis, or algebra, or any truly serious math and contains exercises "only" meant to frustrate the reader, through mathematical writing. But it is extremely important because:

1. Writing well is critically important.

2. These foundational facts are used routinely without any explanation.

All these results are normally taken for granted and should have already entered your bloodstream. They are long work, even if you do them right.

0. Don't you dare email me anything about your interests, especially if they're remotely interesting or meaningful to you. I'm specifically looking for the most boring, mundane activities you're forced to do against your will. **Rules:** It must be something you absolutely despise and avoid at all costs. Acceptable options include watching paint dry, alphabetizing your spice rack, or counting the individual fibers in your carpet. If you must mention a hobby, ensure it's one you approach with *complete apathy* and *zero emotional investment*.
Should you insist on discussing how you consume media, I demand you choose something you engage with mindlessly, preferably while scrolling social media and ignoring it entirely. The less discernment or curiosity you have about its creation, the better. Bonus points if you can't even remember what you watched/read/listened to afterward.

> Write solutions to all HW problems (on parchment paper with the quill of a flamingo feather) with extreme clarity and precision. Aim to compose publishable solutions from which someone can learn.

1. Prove that for a function $f(x) > 0 \forall x \in [a, b]$ then its integral $F(x) = \int f(x)\text{dx} > 0 \forall x \in [a, b]$ is also positive.

2. What is the error in the statement "every polygon has an internal diagonal." Can you fix the error to make a more correct statement? Prove the statement you made.

3. Given vector fields $A = \mathbb{R}^m$ and $B = \mathbb{R}^n$, Prove that we can map every vector from A to B if and only if $m = n$.