

Ethics in Mathematics Research

Before we look into this more closely, let's consider a few scenarios and discuss whether or not you think it's ethical.

Part 1: Scenario Analysis

Answer *Ethical, Unethical, or It Depends* for each.

1. **The Shared Idea:** You and a friend are at coffee. They sketch a rough idea for a Lemma on a napkin. You go home, formalize it, and use it as the backbone of your senior thesis. You don't mention the friend because "they didn't actually write the proof."
2. **The Preprint Discovery:** You are 90% done with a proof. You check the arXiv and see a paper posted two weeks ago by a professor in France that proves the exact same result using a nearly identical method. You decide to finish and submit your paper anyway without citing the preprint, arguing your work was "independent."
3. **The "Citation Circle":** Your advisor asks you to add three citations to their previous papers in your bibliography. These papers are loosely related to your topic but aren't strictly necessary for your proof.
4. **The Standard Result:** You use the *Contraction Mapping Theorem* in your paper. You don't cite Banach's original 1922 paper because it is considered "common knowledge" in analysis.

Part 2: Short Answer

5. **The "Giant's Shoulders" Question:** If you find a mistake in a previously published paper and provide the correction in your work, do you still have to cite the original (flawed) paper? Why or why not?
6. **Alphabetical Anxiety:** In math, authors are listed alphabetically (e.g., Abel, Bernoulli, Cantor). If "Abel" did 90% of the work and "Cantor" only did 10%, is it ethical to stick to alphabetical order? How should the contribution be clarified?

Part 3: Discussion Case

You found a brilliant, non-standard proof for a homework-style Lemma on **Mathematics StackExchange**. You didn't copy the text, but you used the same specific "trick" (e.g., a very clever substitution) that the user `MathWizard99` suggested.

- **The Question:** Is it enough to say "a known trick" in your paper, or do you need to cite a username from a forum? How does this affect your credibility?