Common Mistakes

The following are some of the most common mistakes people make when writing mathematical proofs.

1. **Arguing from examples.**

   Looking at examples is one of the most helpful practices a problem solver can engage in and is encouraged by all good mathematics teachers.

   However, it is a mistake to think that a general statement can be proved by showing it to be true for some special cases. A property referred to in a universal statement may be true in many instances without being true in general.

   52

Common Mistakes

2. **Using the same letter to mean two different things.**

   Some beginning theorem provers give a new variable quantity the same letter name as a previously introduced variable.

3. **Jumping to a conclusion.**

   To jump to a conclusion means to allege the truth of something without giving an adequate reason.

4. **Assuming what is to be proved.**

   To assume what is to be proved is a variation of jumping to a conclusion.

   53

Common Mistakes

5. Confusion between what is known and what is still to be shown.

A more subtle way to engage in circular reasoning occurs when the conclusion to be shown is restated using a variable.

(handwritten) Do this, but only in a comment in brackets with N.T.S.

(handwritten, left margin) NOT IN THIS CLASS!

6. Use of *any* rather than *some*.

There are a few situations in which the words *any* and *some* can be used interchangeably.

(handwritten) Use only in Universal Statements!

(handwritten) Use only in Existential STATEMENTS!

54

Common Mistakes

7. Misuse of the word *if*.

Another common error is not serious in itself, but it reflects imprecise thinking that sometimes leads to problems later in a proof. This error involves using the word *if* when the word *because* is really meant.

(handwritten) DON'T use "If" when you mean "Because".

55