MATH1050 Proof-writing Exercise 1 Index of Comments

1. **CR.** (This applies to Q2b, Q3.)

   You are cramming two or more ideas into the same line, thus making the whole line unclear.

   For instance, it is unclear what is meant by

   > '*There exists some integer k such that $x = k \cdot 0 = 0$.*'

   '*There exists some integer k such that $x = k \cdot 0$*' is one thing: you are applying the definition of divisibility to relate x and 0.

   '$k \cdot 0 = 0$' is another thing: you are evaluating the product $k \cdot 0$.

   You should slow down, and write out the ideas one-by-one, expounding at most one idea within one sentence.

2. **CASE.** (This applies to Q3.)

   You should indicate clearly to the reader that you are 'splitting' the argument into various cases, in each of which there may be specific extra assumptions.

3. **DEF.** (This applies to Q2, Q3.)

   Look up the definition. (In this case, it is the definition of divisibility for integers.) You are not adhering to definition in your argument, or you have missed out key logical features in the definition. For this reason, your argument is deemed wrong.

4. **FOR.**

   There are too many meanings for the word '*for*'. Choose an appropriate word, other than '*for*' to indicate what you actually means. (You do not want the reader to read your passage in such a way that you don't intend.)

5. **MA.** (This applies to Q2b, Q3.)

   At least part of the assumptions is missing. But you are going to use these assumptions in the argument. The reader is not responsible to write out the missing assumptions for you, and will simply regard your argument as wrong when you are applying the 'missing assumptions'.

   Example. An argument for the statement

   > '*Let $x, y \in \mathbb{Z}$. Suppose x is divisible by y and y is divisible by x. Then $|x| = |y|$.*'

   should start with the words

   > '*Let $x, y \in \mathbb{Z}$. Suppose x is divisible by y and y is divisible by x.*'

   The reason is that each of '$x \in \mathbb{Z}$', '$y \in \mathbb{Z}$', 'x is divisible by y', 'y is divisible by x' is used somewhere in the subsequent lines.

6. **MC.** (This applies to Q3.)

   There is a missing case. Your subsequent argument is therefore incomplete and/or wrong.

7. **MEAN.** (This applies to Q2, Q3.)

   What is '*this means*'? What is '*which means*'? The logic in unclear. Do not use the word '*mean*' in a formal argument. Find a more appropriate word whenenver you want to use '*mean*'.

8. **NZ.** (This applies to Q2, Q3.)

   You are dividing by something which is not known to be zero or not.

9. **PC.**

   Punctuation and capitals should be used appropriately so as to indicate to the reader how the passage is to be read. Omissions may result in the reader being confused with the logic and/or the mathematical content in what you are writing.

10. **QF.** (This applies to Q2b, Q3.)

    At least one of the things described below has happened:

    (a) When you are introducing a new object which you are going to denote by k through the statement

'*there exists some $k \in \mathbb{Z}$ such that $a = kb$.*'

you must state this line in full. It is wrong to just write something like

'$k \in \mathbb{Z}$, $a = kb$.*'

(b) You have misunderstood the logical structure and the mathematical content in

'*there exists some $k \in \mathbb{Z}$ such that $a = kb$.*'

You have ignored the ideas of 'existence' of the object denoted by the symbol k, and/or its dependence on the objects a, b.

This matters in the logical structure of the subsequent lines of the argument. Your subsequent argument fails entirely because of it.

(c) This statement in which the quantifier '*there exist*' has appeared is not stated in an appropriate way: its logical structure has not been given due respect.

(d) It is inappropriate to write something like '*there exists some integer* 1 *such that* $0 = 1 \cdot 0$'.

11. **SISU.**

'*Since*' (or '*because*') is different from '*suppose*' (or 'assume'). Look up the entries in the dictionary. Do not confuse these words when you read and/or write.

12. **SUP.** (This applies to Q3.)

Use the word 'suppose' for indicating what you are supposing (or supposing in extra) here, in a 'special case' within an argument.

13. **WD.**

The deduction at this place is wrong.