

Notes on “A special case of Dirichlet’s theorem”

“Papa”

I embellished this in class on 02Oct2009. If you missed class, please get notes from a colleague.

This refers, on our Teaching Page <http://www.math.ufl.edu/~squash/teaching.html#NumberTheory> to link “A special case of Dirichlet’s theorem”. Refer to that link for definitions of **6Neg** and **6Pos**.

General philosophy. Proofs are essays, written in complete, grammatical, punctuated sentences, that make sense. Sentences start with a **word** (not a math symbol), and end with a **visible period**. (...or, occasionally, a “!” or “?!”)

Details. Different-case symbols are different symbols. Don’t confound “ n ” with “ N ”.

Underline (or boldface) words (*not* symbols) that you define.

Proofs start with “*Proof:*”, perhaps with more detail, e.g. “*Proof of (17a) in the $N=3$ case:*”.

Break proofs into paragraphs; generally, just *one idea* per paragraph.

Write existential quantification explicitly, e.g. “*There exists...such that...*”. It is ok to use “*st.*” to abbrev “such that”. E.g. “*There exists $\beta \in \mathbb{Z}_-$ st. $\beta < -8$* ”. If you want to use “ \exists ”, then remember to start the sentence with a *word*. E.g., “*Hence $\exists \beta \in \mathbb{Z}_-$ st. $\beta < -8$* ”. Now that there is a word/phrase there, we can think about replacing it with a *better* word/phrase. E.g. “*Because there are only many negative integers, $\exists \beta \in \mathbb{Z}_-$ st. $\beta < -8$* ”.

Idea in proof. We produce a pair N, K of posints, where N has *each* given p_j as a factor, and the difference, $K - N$, has **no** given prime as a factor.

Finally, K must have a least one 6NEG prime factor; this is arranged by constructing K to be 6NEG (and proving a lemma about the factorization of 6NEG numbers).

Infelicities in Papa’s exposition. Overuse of “works”; “works” is vague. Better: “*Proof that (4) always produces a new 6NEG prime*”.

Misc. Only use “equivalent” to mean “logically equivalent”. Otherwise, use the specific phrase that you need, e.g. “*equal*”, “*parallel*” (for lines), “*congruent mod-5*”, “*geometrically congruent*”, “*group-isomorphic*”, “*ring-isomorphic*” (or “isomorphic as rings”), “*(geometrically) similar*” (homothetic), “*equi-numerous*” (same cardinality), etc.

Avoid weasel words such as “essentially” and “basically”; this, unless you really are only giving an approximate truth, and you have *explained what* is approximate. Don’t tell me

“Essentially, $2 + 2$ is basically equivalent to 4.”

Instead, write “... $2 + 2$ equals 4.”

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