

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 contructing 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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latex

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