

# MATH 110B—WRITING ASSIGNMENT 06

Due: Sunday October 20, by 7PM

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## Getting Started

1. Get the template for this assignment. Here's how to do it:

- Go to <https://v2.overleaf.com/>, and **make sure you are logged in**.
- In a new window, go here:

<https://www.overleaf.com/read/xmrhpcdkcvfd>

- Click on the menu icon in the upper-left and select “Copy Project”
- When ask for a name, choose something like “Math 110B - WA 06” and click “Copy”
- When this completes you will be back in your own workspace (instead of mine).
- After solving the problem(s), type them up using the template.
- Email me your final draft.

2. Let me know if you have any questions!

If you have trouble finding the command for a math symbol you want to use, try looking in this document:

<http://mirror.hmc.edu/ctan/info/short-math-guide/short-math-guide.pdf>

Please type up your proofs to the following problems in  $\text{\LaTeX}$ . Take care to use complete sentences and appropriate punctuation, and make sure to edit for typos. Email me your final draft. *Please let me know if you have any questions!*

1. Let  $F$  be a field, and let  $a(x), b(x) \in F[x]$  be nonzero polynomials. Define

$$I = \{f(x)a(x) + g(x)b(x) \mid f(x), g(x) \in F[x]\}.$$

If  $d(x)$  is the greatest common divisor of  $a(x)$  and  $b(x)$ , then  $I = \{p(x)d(x) \mid p(x) \in F[x]\}$ .  
(See Corollary 5.55.)

- Make sure to show  $I \subseteq \{p(x)d(x) \mid p(x) \in F[x]\}$  and  $\{p(x)d(x) \mid p(x) \in F[x]\} \subseteq I$ .
- *Make sure to clearly state when you are using a definition, lemma, theorem, corollary, or fact from the notes.*