

**NAP 2019, MODULE 1, HOMEWORK ASSIGNMENT #2, DUE
MONDAY, MAY 20**

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• **Homework Assignment** (due Monday, May 20, 10 pm Kathmandu time). Here are 14 problems; do 11 of them (so you may choose three of them to omit).

- (1) pp. 23–24: 3.4, 3.7, 3.9
- (2) p. 27: 3.10, 3.11 (but assume that $a \neq 0$), 3.12, 3.14
- (3) p.29: 3.16, 3.17, 3.18
- (4) pp. 30–31: 3.19 (but please show, instead, that if a b are non-zero elements then they have a GCD (= HCF) if and only if they have an LCM. Quite honestly, we don't quite see how to do this. As the example in 3.12 shows, if d is the GCD of a and b , then the LCM is not necessarily $\frac{ab}{d}$, as it is in a UFD. Take the elements $a = 2 + i\sqrt{5}$ and $b = 3$. Their GCD is, presumably, 1, but their LCM is, presumably, 9. Or is it?? You might want to skip this problem!
- (5) pp. 34–35: 3.24, 3.25, 3.26

• **General Rule Concerning Homework:** You are expected to *prove* everything. This applies, for example, to Problem 1.13 on page 9 (on the homework due Monday, May 13). You are asked to decide which of four subsets of \mathbb{C} are subfields of \mathbb{C} . For each one of these you should *prove* that it is or is not a subfield.