

Introduction to Number Theory (M328K)

Homework # 9

Fall 2025

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1. §9.1 # 2.
2. §9.1 # 8.
3. §9.1 # 12.
4. §9.1 # 20. (*Hint:* Let $t = \text{ord}_p(2)$. First, prove that $t \mid 2^{n+1}$. To get that $t = 2^{n+1}$, use a proof by way of contradiction: if we suppose $t \mid 2^n$, we get a contradiction.)
5. §9.2 # 4.
6. §9.2 # 6.
7. §9.2 # 8. (*Hint:* if $p = 4k + 1$, prove first that $-r \equiv r^{2k+1} \pmod{p}$. Use this to compute $\text{ord}_p(-r)$.)
8. §9.2 # 9.