

HOMEWORK 5 - DUE WED. OCT 30

1. (Schumer 3.2 Prob. 2) If $n = \prod_{i=1}^t p_i^{a_i}$, derive a formula for $\sigma_r(n)$, where $\sigma_r(n)$ is the sum of the r th powers of divisors of n .

2. (Schumer 3.3 Prob. 5)

- a) Find all n for which $\phi(n) = 6$
- b) Find all n for which $\phi(n) = 12$

3. (Schumer 3.3 Prob. 12) Define the von Mangoldt Lambda Function by

$$\Lambda(n) = \log(p)$$

if n is a prime power p^t for $t \geq 1$, and 0 otherwise.

- a) Prove that $\sum_{d|n} \Lambda(n) = \log(n)$
- b) Show that $\Lambda(n) = -\sum_{d|n} \mu(d) \log(d)$.

2. (Schumer 4.1 Prob. 2)

- a) Find all primitive roots *mod*11
- b) Find all primitive roots *mod*17

2. (Schumer 4.1 Prob. 10)

- a) Solve $x^5 \equiv 6 \pmod{13}$
- b) Solve $x^4 \equiv 9 \pmod{13}$