

Outline notes for PS05
Math 126

Definitions. (Ch. 10) $\pi(x)$ (number of primes $\leq x$).

Problem outlines.

11.3 *Assume:* $m = p_1^{a_1} p_2^{a_2} \dots p_r^{a_r}$, p_i distinct primes. (This is what is meant by “Let p_1, \dots, p_r be the distinct primes that divide m .”)

Conclude:
$$\varphi(m) = m \left(1 - \frac{1}{p_1}\right) \left(1 - \frac{1}{p_2}\right) \dots \left(1 - \frac{1}{p_r}\right).$$

11.11 (b) Note that if p is a prime that divides n , then for some k , $\varphi(p^k)$ must divide $\varphi(n)$ (why?). Keep going along these lines (not easy!).

(c) Do this by trial and error, using your list from (b).

12.2 *Assume, by contradiction:* Suppose that there are only finitely many primes congruent to 5 (mod 6), namely, 5, $p_1 = 11$, p_2, \dots, p_r . Let $A = 6p_1 \dots p_r + 5$.

(eventually contradiction)