

1. Suppose that  $n > 2$  and  $c_1, \dots, c_{\phi(n)}$  is a reduced residue system modulo  $n$ . Show that

$$c_1 + c_2 + \cdots + c_{\phi(n)} \equiv 0 \pmod{n}$$

Your answer here...

2. Suppose that  $a$  and  $b$  are relatively prime integers greater than 1. Show that  $a^{\phi(b)} + b^{\phi(a)} \equiv 1 \pmod{ab}$

Your answer here...

3. *Find all positive integers  $n$  such that  $\phi(n) = 12$ . Be sure to prove that you have found all solutions.*

Your answer here...

4. *For which positive integers  $n \geq 2$  does  $\phi(n) \mid n$ ?*

Your answer here...

5. (*Extra Credit—and don't use the internet for this one*) Prove that  $\lim_{n \rightarrow \infty} \phi(n) = \infty$

Your answer here...