<u>Friday Discussion: Week #8</u>

<u>The Euler φ-function</u>

a. Recall that two integers are *relatively prime* if the only divisor they have in common is ± 1. We then use this notion to define the Euler φ-function (pronounced "fee-function"): If n is a natural number, then $\varphi(n)$ equals the number of integers from 1 to n that are relatively prime to n.

b. After we discuss as a class the ideas in part a. we will break up into groups and calculate the following values:

$\varphi(4)$
$\varphi(9)$
$\varphi(25)$

Do you see a pattern?

Test it on:

$\varphi(16)$
$\varphi(36)$
$\varphi(49)$

Discuss your findings with your group. Then calculate:

$\varphi(8) = \varphi(2 \cdot 2 \cdot 2)$
$\varphi(27) = \varphi(3 \cdot 3 \cdot 3)$
$\varphi(125) = \varphi(5 \cdot 5 \cdot 5)$

Discuss with your group any other patterns you see.