Problem 8. For positive integer $n$, the Euler totient function, $\phi(n)$, gives the number of positive integers less than or equal to $n$ and relatively prime to $n$. For example, $\phi(15) = 8$ because the set of positive integers relatively prime to 15 and less than or equal to 15 is

$$\{1, 2, 4, 7, 8, 11, 13, 14\}.$$ 

Find all positive integers $n$ for which $\phi(n) = n - 4$.

Solutions due by 10:00am Monday, March 7.
This problem was proposed by Mehtaab Sawhney, a New York high school student.