The Euclidean algorithm: if $a > b$ are integers then $\gcd(a, b) = \gcd(a \bmod b, b)$. If $\prod_{i=1}^{n} p_i^{e_i}$ is the prime factorization of x then

$$S(x) = \sum_{d|x} d = \prod_{i=1}^{n} \frac{p_i^{e_i+1} - 1}{p_i - 1}.$$