

Name:

Problem 1: Recall the functions τ , σ , μ and φ defined in class. Please compute the following values:

a) $\tau(6)$

$\tau(n)$ is the number of positive divisors of n . The positive divisors of 6 are 1, 2, 3 and 6, so $\tau(6) = 4$.

b) $\sigma(5)$

$\sigma(n)$ is the sum of the positive divisors of n . The positive divisors of 5 are 1 and 5, so $\sigma(5) = 1 + 5 = 6$.

c) $\mu(8)$

Here $8 = 2^3$. Since this is divisible by $4 = 2^2$, $\mu(8) = 0$.

d) $\varphi(12)$

The distinct primes dividing 12 are 2 and 3. Therefore

$$\begin{aligned}\varphi(12) &= 12 \left(1 - \frac{1}{2}\right) \left(1 - \frac{1}{3}\right) \\ &= 12 \cdot \frac{1}{2} \cdot \frac{2}{3} \\ &= 4\end{aligned}$$