

MOCK MIDTERM EXAM

In the exam, there are four problems, each is worth six points. Note that complete arguments are required. Please make sure that you write your name on every page.

1. Compute $\tau_1(2016)$. **(6 points)**

2. Prove that if $n > 42$, then there exist positive integers x, y such that the equation

$$6x + 7y = n$$

holds. **(6 points)**

3. Prove that if $p > 2$ is a prime, and a, b are primitive roots modulo p , then ab is not a primitive root modulo p . (**6 points**)

4. Prove that there exist positive integers n satisfying $\tau_1(n) > 100n$. **(6 points)**