

NAME:

SID:

---

**Problem 1:** Use the  $\Theta$ -notation to determine the rate of growth of the following functions:

Function	$\Theta$ estimate
$5n + 3n^2 + 3$	
$17n + 3n^2 \log n + 1$	
$7n^9 + (1.5)^n$	
$n^3 4^n + 5^n + 16\sqrt{n}$	
$\sqrt{n} + 11 \log n$	

---

**Problem 2:** (a) State Euclid's Algorithm.

(b) Use Euclid's Algorithm to compute the greatest common divisor of 391 and 299. Show your work.

---

**Problem 3:** (a) Give the factorization of 1386. Show your work.

(b) Determine  $10^{-1} \pmod{13}$ , the inverse of 10 modulo 13. Show your work.