

A1: _____ 35pts

A2: _____ 100pts

A3: _____ 20pts

Essay not
double-spaced: _____ -15pts

Total: _____ 155pts

In complete English sentences on your own sheets of paper, please write, double-spaced, this proof. Do not restate the problem.

A1: Prove that the set of primes is infinite. [Euclid's theorem]

A2: *Show no work. Write DNE in a blank if the described object does not exist or if the indicated operation cannot be performed.*

a Euler $\varphi(121000) =$ _____ .
Express your answer as a product $p_1^{e_1} \cdot p_2^{e_2} \cdot \dots$ of primes to posit powers, with $p_1 < p_2 < \dots$

b LBoat gives $G := \text{Gcd}(413, 294) =$ _____ . And $413S + 294T = G$, where $S =$ _____ & $T =$ _____ are integers.

c Since $4800 = 2^6 \cdot 3^1 \cdot 5^2$, it has _____ many positive divisors. [Write ANS naturally as a product of integers.]

d $[\sqrt{3}^{\sqrt{2}}]^{\sqrt{8}} =$ _____ . $\log_8(4) =$ _____ .

e Compute the sum of this geometric series:
 $\sum_{n=1}^{\infty} [-1]^n \cdot [3/5]^n =$ _____ .

A3: Math-Greek alphabet: Please write the two missing data of lowercase/upercase/name. Eg:

“iota: _____ α : _____ B: _____ .” You fill in: ι I A alpha β beta.

Ω : _____ Λ : _____ Γ : _____

ξ : _____ σ : _____ η : _____

rho _____ theta _____ zeta _____ mu _____

End of Matt Prereq-A