Name: _____ .

Show all work clearly and in order. Justify your answers whenever possible; You have 20 minutes to take this 10 point quiz.

1. (*5 points*) Provide asymptotic notation (O, Θ, Ω) to the following functions (please use Θ whenever possible),

1. $50n \in$ ___$(\sqrt{n})$

2. $n! \in$ ___(n^n)

3. $\log n^5 \in$ ___$(\log 10^n)$

4. $(3n)! \in$ ___$((10n)!)$

5. $4.999^n \in$ ___(5^n)

2. (*2 points*) What is 5^{123} mod 124? Please show steps of how you get the answer.

3. (*3 points*) What is $\gcd(48, 7^{100})$? Please show steps of how you get the answer.