

Open brain, closed book/notes. Please write four short essays. Write in complete, grammatical, correctly-spelled English sentences.

QA1: Let K be the smallest integer such that

*: $\forall n \in [K .. \infty) : 3^n > 50 + 2^n.$

Then $K = \underline{\hspace{2cm}}.$

On your own sheets of paper, write a careful induction proof of (*), using your value of K .

Little essays. On your own sheets of paper, write a careful definition of each the following three statements. You may freely use the symbols $\mathbb{Z}, \mathbb{N}, \mathbb{Q}, \mathbb{R}, \exists, \forall$ and the symbols $\cdot, +, -, =, \neq$. You may also use the “divides” \bullet symbol.

You must not use the words: reduces, splits, factor, divisor, divides, unique, only etc..

QA2: Give a fully-quantified definition of the statement:
“There is no largest integer.”

QA3: Give a fully-quantified definition of the statement:
“The natnum 675 is irreducible in \mathbb{N} .”

QA4: Give a fully-quantified definition of the statement:
“The natnum 675 is prime in \mathbb{N} .”

No equivalence-relations were harmed in the making of this quiz.

QA1: 20pts

QA2: 15pts

QA3: 15pts

QA4: 15pts

Total: 65pts

Please PRINT your name and ordinal. Ta:

Ord:

HONOR CODE: “I have neither requested nor received help on this exam other than from my professor.”

Signature: