Staple!

Ord: ___ ___

Abstract Algebra MAS4301 09B1 **Class-B** Prof. JLF King Wednesday, 30Oct2019

Hi. Write **DNE** if the object does not exist or the operation cannot be performed. NB: **DNE** $\neq \{\} \neq 0 \neq$ *Empty-word*.

B4: Show no work.

___ a Prof. King thinks that submitting a ROBERT LONG PRIZE ESSAY [typically 2 prizes, \$500 total] is a *really good idea*. A ten-page essay is fine. Date for the emailed-PDF is Monday, March 23, 2020.

Circle: **Yes** **True** ***Résumé material!***

___ b Let $V_K := G \times \overset{K}{\cdots} \times G$, where $G := (\mathbb{Z}_2, +)$. *As A Decreasing Product of Integers,* $|\mathrm{Aut}(V_6)| =$ ⌞. . . . . ⌟.

___ c TTT-auts T, S, R, F [Traffic-light, Swizzle, Rotation, Flip] generate the group $\mathbf{\Gamma}$ of 4×4-auts. Let Ω be the *set* of 10 TTTs on which $\mathbf{\Gamma}$ acts, with V the leftmost *Vertical* TTT, and D the upper-left to lower-right *Diagonal* TTT. The Orb-Stab thm implies

$|\mathrm{Stab}_{\mathbf{\Gamma}}(\mathsf{V})| =$ ⌞. . . . .⌟ and $|\mathrm{Stab}_{\mathbf{\Gamma}}(\mathsf{D})| =$ ⌞. . . . .⌟.

In std form, $\mathrm{Stab}_{\mathbf{\Gamma}}(\mathsf{V}) =$ ⌞. . . . . ⌟.

___ d *Shuffling* $2N$*-card deck*: Put the upper N in your right hand, and the lower N in left hand. Drop a RH card, then a LH, then RH, etc. [New bottom-card came from RH; new top-card from LH.] So $S_N := \mathrm{Sign}(\pi_N) =$

And S_{2019} *is* circle **+1** **−1** . ⌞. . . . . ⌟

___ e Mod K:=51, the recipr. $\langle \frac{1}{20} \rangle_K =$ ⌞. . . . .⌟ $\in [0\,..\,K)$.

[*Hint:* ↯] So $x =$ ⌞. . . . .⌟ $\in [0\,..\,K)$ solves $5 - 20x \equiv_K 2$.

OYOP: *In grammatical English* ***sentences****, write your essay on every* 2^{nd} *line* (usually)*, so that I can easily write between the lines.*

B5: Suppose $\boldsymbol{\tau}$ is the unique element of order 2 in a [possibly infinite] group G. Prove that $\boldsymbol{\tau} \in \mathrm{Z}(G)$, the center of G.

B-Home:	___ ___ ___	325pts
B4:	___ ___ ___	120pts
B5:	___ ___	45pts
Total:	___ ___ ___	490pts