Numbers & Polys
MAS3300

Exam-S

Prof. JLF King
Touch: 21Feb2017

Total: ___ ___ ___ 275pts

Ordinal:

Print name . . . . . Ord:

Note. This is an open brain, open (pristine) Sigmon-Notes exam. Please write each solution on a separate sheet of paper. Write expressions unambiguously e.g, "$1/a+b$" should be bracketed either $[1/a]+b$ or $1/[a+b]$. (Be careful with **negative** signs!) Every "**if**" must be matched by a "**then**".

S1: Compute $D := \text{Gcd}(51, 30) =$ . . . . via the Lightning Bolt (Euclidean) algorithm. Give integers $S =$ . . . . and $T =$ . . . . so that $51S + 30T = D$.

S2: For each of the following statements in quotes, circle one of T F. *Then* provide a **proof** or a **CEX with explicit numbers**.

a "Addition distributes over mult." T F

b On $\mathbb{R}$ define $x \triangleleft y := [x \cdot y] + y$. Then "binop $\triangleleft$ is associative". T F

S3: Please prove Thm1.4d: (P.2)
If $e \in \mathbb{R}$ is an multiplicative-identity then $e = 1$.

S4: A person P is a ***prewash*** if P is a *female* ancestor of George Washington. Write a recursive definition that starts

Prewash: A person who. . .

that avoids words "ancestor", "descendant" etc. It may use "child", "parent", "son", "mother" etc.

S5: Let "$*$" mean "*theorems from* (1.15d) *and earlier*". Using $(*)$ prove: Lemma: *If $z \neq 0$ then z^2 is positive.* Now use this and $(*)$ to prove that $-1 < 0$.

***Bonus*:** Write the set of PRIMES using set-builder notation.

S1:	___ ___	65pts
S2:	___ ___	50pts
S3:	___ ___	55pts
S4:	___ ___	55pts
S5:	___ ___	50pts
Bonus:	___ ___	15pts

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

Signature: . . . . . .

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