Staple!

Geometry MTG3214 03H9 **Prac-A** Prof. JLF King 3Sep2015

(This is much longer than the actual exam.)

OYOP: *In grammatical English* ***sentences****, write your essay on every* ***third*** *line* (usually)*, so that I can easily write between the lines. Do* **not** *restate the question.*

For $n,k \in \mathbb{Z}$, let $n \perp k$ mean $\text{Gcd}(n,k) = 1$. Let ***E.G*** abbreviate *Euclidean Geometry*.

A1: Integers a, b, c form a Pythagorean triple, $a^2+b^2 = c^2$. Suppose $a \not\perp b$. Prove that $b \not\perp c$.

A2: Show by explicit example that SAS does not hold in the taxicab geometry on $\mathbb{R}^2$.

A3: In E.G, prove that the three angle-bisectors of $\triangle ABC$ intersect at a point; call it P. What is the name of this point?

A4: Carefully state the *Central-angle theorem* for a circle. *Prove* the *Central-angle thm*.

A5: State and prove the *Pythagorean theorem*.

A6: On a set Y, a ***metric*** m is a map

.... $\to$ .... such that $\forall$ .... :

MS1: ....

MS2: ....

MS3: ....

MS4: ....

A7: On $\mathbb{R}$-VS X, a ***norm*** $\|\cdot\|$ is a map ...... $\to$ ...... satisfying these three axioms. [*Hint:* Quantifiers.]

N1: ....

N2: ....

N3: ....

N4: ....

A8: Short answer. Show no work.

Please write **DNE** in a blank if the described object does not exist or if the indicated operation cannot be performed.

a Vertices $A := (8,4), B := (-6,-2), C := (-2,-2)$ form a triangle T whose circum-center is (...... , ...).

Also, $\text{Centroid}(T) =$ (...... , ...).

b A particular Pythagorean triple has $a^2 + 40^2 = c^2$, where $a =$ .... and $c =$ ....

c Let $\mathbf{v} := (3,-3,-1,1,2) \in \mathbb{R}^5$; so $\|\mathbf{v}\|_3 =$ ....

End of Prac-A

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: ....