

A1: 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 $A := (4, 0), B := (0, -4), C := (-4, -2)$ form a triangle T whose circum-center is (\dots, \dots) .

Also, Centroid(T) = (\dots, \dots) .

b On a set Y , a *metric* m is a map

$\dots \rightarrow \dots$ such that $\forall \dots$:

- MS1: \dots
- MS2: \dots
- MS3: \dots
- MS4: \dots

c In the \mathbb{L}_3 -metric, the distance between points $(3, 8)$ and $(-1, 5)$ is \dots .

d A primitive Pythagorean triple has $28^2 + b^2 = c^2$, where $b = \dots$ and $c = \dots$ with $b \perp c$.

OYOP: In *grammatical English sentences*, write your essays 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*.

A2: Integers a, b, c form a Pythagorean triple, $a^2 + b^2 = c^2$. Suppose $a \not\perp b$. Prove that $b \not\perp c$.

A3: Carefully state the *Central-angle theorem* for a circle. Prove the *Central-angle thm*. You may use for free that the angles opposite the equal sides of an isosceles triangle, are equal.

A4: Write the truth-table for $B \Rightarrow [[\neg B] \Rightarrow C]$.

A1: _____ 80pts

A2: _____ 45pts

A3: _____ 40pts

A4: _____ 20pts

Total: _____ 185pts