

MBMT Geometry Round — Jacobi

March 8, 2026

Full Name _____

Student ID Number _____

**DO NOT BEGIN UNTIL YOU ARE
INSTRUCTED TO DO SO.**

This round consists of **8** questions. You will have **30** minutes to complete the round. Each question is *not* worth the same number of points. Questions answered correctly by fewer competitors will be weighted more heavily. Please write your answers in a reasonably simplified form.

- _____ 1. Four points A , B , C , and D , lie on a line in some order and satisfy $BC = 4$, $AC = 6$, and $BD = 12$. What is the largest possible value of AD ?
- _____ 2. What is the distance from the origin to the point $(3, 4, 12)$?
- _____ 3. A rhombus of side length 6 has a diagonal of length 6. What is the area of the rhombus?
- _____ 4. Let S be a hexagon of side length 2. Andy draws a flower-shape onto the hexagon by constructing a circle of radius 1 at each vertex of P . What is the perimeter of Andy's new closed flower?
- _____ 5. Equilateral triangle $\triangle ABC$ has a side length of 1. A regular pentagon $BCDEF$ is constructed on the exterior of $\triangle ABC$. In degrees, what is the measure of angle $\angle DAF$?
- _____ 6. Triangle $\triangle ABC$ has $AB = 16$ and $AC = 17$. There exists a point P outside $\triangle ABC$ such that $AP = 16$, $CP = 17$, and $\overline{AC}$ is perpendicular to $\overline{PB}$. What is the area of quadrilateral $PABC$?
- _____ 7. Square $ABCD$ has side length 4, and M is the point on segment $\overline{BC}$ such that $CM = 1$. A circle ω with radius r is constructed tangent to segments $\overline{AM}$, $\overline{AD}$, $\overline{CD}$. What is the area of ω ?
- _____ 8. $\triangle ABC$ has side lengths $AB = 5$ and $AC = 8$. Let ω be the circle passing through A , B , and C , and let O be the center of ω . Let O_1 and O_2 be reflections of O across B and C , respectively. Given that segment $\overline{O_1O_2}$ is tangent to ω , what is the value of $[\triangle AO_1C] + [\triangle AO_2C]$?
- ($[\triangle ABC]$ denotes the area of triangle $\triangle ABC$)