

MBMT Algebra 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. What is the product of all x that satisfy $(x - 1)^2 = 25$?
- _____ 2. Thomas buys 2 burgers and 3 fries from McWei's for \$29 dollars. Sam then buys 3 burgers and 2 fries from McWei's for \$31 dollars. How much would buying one burger and one fry cost, in dollars?
- _____ 3. A positive number multiplied by its square root is 512. What is that number multiplied by its cube root?
- _____ 4. Mr. Schwartz has a square-shaped bar of chocolate, broken into 45×45 congruent squares. Every day, he chooses one of the top, left, bottom, or right sides of the bar, and then eats the entire edge of squares corresponding to that side of the bar. If he has 455 congruent squares of chocolate remaining, how many days has it been since he started eating the chocolate bar?
- _____ 5. How many ordered triplets of integers (x, y, z) satisfy $x + y = 12$ and $xz = y + z$?
- _____ 6. Let $P(x)$ be a quadratic polynomial with leading coefficient 1 such that the solutions to $P(x)^2 = 16$ are 1, 3, 5, and 7. Find $P(0)$.
- _____ 7. Katherine is studying a polynomial $f(x) = x^4 - ax^2 + b$. She wants to choose an ordered pair of real numbers (a, b) so that $a + b = 169$ and all roots of $f(x)$ are integers. What is the sum of all possible a she can choose?
- _____ 8. Let a , b and c be positive real numbers that satisfy

$$2026ab = c^2 + 1$$

$$2026ac = 8b^2 + 2$$

$$2026bc = \frac{a^2}{8} + \frac{1}{2}.$$

What is the value of $a + b + c$?