

MBMT Algebra Round – Bernoulli

April 16, 2023

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 A car is driving at 60 miles an hour. How many miles will it travel in 5 hours?
- _____ 2 Mario has some fire flowers and some ice flowers. He has a total of 16 flowers, and he has 3 times more fire flowers than ice flowers. How many ice flowers does he have?
- _____ 3 Yunyi discovers that when he multiplies a number by 2, he gets the same result as if he added 5 to the number. What is the number?
- _____ 4 At noon, a clock shows the correct time. At m minutes after noon, the clock suddenly starts ticking at half the speed it should. At 1:30, the clock shows 1 o'clock. Find the value of m .
- _____ 5 Victor is making a batch of brownies. He takes the pan and makes a number of cuts parallel to the edges of the pan. If he ends up with 63 brownies of equal size, what is the minimum number of cuts he could have made?
- _____ 6 Compute $\sqrt{10004 \cdot 9996 + 16}$.
- _____ 7 Let a_n be the sum of integers from 1 to n (for instance, $a_1 = 1$, $a_3 = 1 + 2 + 3$). And let $b_n = \frac{a_{2n-1}}{a_{2n}}$. Find $b_1 \cdot b_2 \cdot b_3 \cdot \dots \cdot b_{10}$.
- _____ 8 Suppose Bradley has a sequence such that $x_n = 3x_{n-1} + 2$. If $x_0 = 0$, then what is x_{20} ?