

MBMT Algebra Round — Fermat

Full Name _____

Team 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 worth the same number of points. Please write your answers in the simplest possible form.

- _____ 1. I am thinking of a number. If I triple the number and then subtract 20, I get back the number I started with. What number am I thinking of?

- _____ 2. Chuck the woodchuck chucks 3 chunks of wood per hour when he's in a good mood, and 5 chunks of wood per hour when he's in a bad mood. If Chuck chucks 36 chunks of wood in 10 hours, how many of those hours does he spend in a bad mood?

- _____ 3. There are 90 pieces of candy in a bag. Every minute, Guang steals 5 pieces of candy from the bag, so after one minute the bag has 85 candies, after two minutes the bag has 80 candies, and so on. After how many minutes are there 15 candies left in the bag?

- _____ 4. Two years ago, Mike put \$100 into a bank. Every year, the amount of money Mike has in his bank account increases by 20%. How much money does Mike now have in the bank account?

- _____ 5. If $4^2 \cdot 8^6 = 2^n$, compute n .

- _____ 6. Given that x and y are real numbers such that $x^2 - y^2 = 16$ and $x + y = 2$, compute xy .

- _____ 7. If $x + y + z = 15$ and $\frac{x}{y+z} = 4$, compute x .

- _____ 8. In a certain field, grass grows at a constant rate, no matter the height of the grass. If Farmer John allows 20 cows to eat the grass, it would take them 15 days to eat all the grass in the field. If he allows 30 cows to eat, it would take them 9 days to eat all the grass. How many cows are needed to finish the field in exactly 25 days?