



MCAMC
2019

MCAMC Sample: Individual Round

Do not turn the page until you are told to do so.

This section of the competition is to be completed **individually** within **1 hour**, and this section consists of **20 questions**. No aids such as calculators, notes, compasses, etc. are allowed. All answers must be recorded on this page in order to receive credit. Answers must be exact (do not approximate π) and in simplest form, with all fractions expressed as improper fractions. Examples of unacceptable answers include: $\frac{4}{6}$, $1\frac{1}{3}$, $3 + 2$. Examples of acceptable answers include $\frac{2}{3}$, $\frac{4}{3}$, 5 .

Name: _____

Team Name: _____ Team ID: _____

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|----------|-----------|-----------|-----------|
| 1. _____ | 6. _____ | 11. _____ | 16. _____ |
| 2. _____ | 7. _____ | 12. _____ | 17. _____ |
| 3. _____ | 8. _____ | 13. _____ | 18. _____ |
| 4. _____ | 9. _____ | 14. _____ | 19. _____ |
| 5. _____ | 10. _____ | 15. _____ | 20. _____ |

NOTE: In this sample, only 10 questions are provided. The real competition will include 20 questions. The provided questions are indicative of the style and difficulty of the questions that will be on the real competition.

1. What is $(1 - 2 \times (3 \div 4)) \times 10$?
3. What is the angle between the minute hand and the hour hand on an analog clock at the time 6:20?
5. Alan is thinking about his birthday. He realizes that on January 1 last year, he was 9. But the day after tomorrow, Alan will be 12. What is Alan's birthday?
7. In right $\triangle ABC$, $AB = 5$ and $AC = 13$. Find the length of the altitude to side AC .
9. In a group of friends, one person always lies, one person always tells the truth, and one person sometimes lies and sometimes tells the truth. Alice says, "Catherine never tells the truth." Bob says, "I always lie." Catherine says, "Bob sometimes lies." Who is the liar?
11. Find a 2 digit number where the sum of its digits equals the square root of the number.
13. A spinner has a $\frac{1}{3}$ chance of landing on green and a $\frac{2}{3}$ chance of landing on red. After spinning it 5 times, what is the probability that it lands on red at least twice?
15. Jason is studying for his exams and wants to create a study schedule. Today, he will study for exactly 6 hours. There are 4 subjects he needs to study for, and he will study each for either 1 hour or 2 hours (in a continuous block). How many different study schedules can Jason create?
17. Find the value of $\sqrt{20 + \sqrt{20 + \sqrt{20 + \dots}}}$.
20. A 100-inch long trough has triangular ends with side lengths 6 inches, 8 inches, and 10 inches, with the 10-inch side facing upwards. The trough is initially empty. On a rainy day, rain is captured by the entire 10-inch by 100-inch top surface and collects at the bottom of the trough. Rain falls at a rate of 0.06 inches per hour for 10 hours. What is the height of the water in the trough after the rain stops?