



UGA High School Varsity Math Tournament
October 25, 2025

CIPHERING ROUND

TIME: 2 MINUTES PER PROBLEM

LENGTH: 10 PROBLEMS

MAX SCORE 100 POINTS

10 POINTS FOR A CORRECT ANSWER.

Do NOT OPEN THIS BOOKLET.

No calculators, slide rules, or any other such instruments are allowed.
If your answer is a rational number, make sure to write it as a simplified fraction.

Problem 1.

LAST, FIRST (PRINTED)

ID

ANSWER

Problem 1. Assume that $\frac{a+b}{a} = 26$ and $\frac{b+c}{b} = 82$, what is the value of $\frac{c+a}{c} = N$?

Write your answer as a simplified fraction.

Problem 2.

LAST, FIRST (PRINTED)

ID

ANSWER

Problem 2. Albert (30) and his niece Barbara (17) walk along Milledge. They pass in front of Milan's house and they realize that the house number added to the age of either one is a perfect square. What is Milan's house address?

Problem 3.

LAST, FIRST (PRINTED)

ID

ANSWER

Problem 3. What is the length of the longest possible list of distinct elements in $\{1, 2, 3, \dots, 999\}$ such that each element divides its successor?

Problem 4.

LAST, FIRST (PRINTED)

ID

ANSWER

Problem 4. What is the number of three term geometric progressions

$$0 \leq a_1 \leq a_2 \leq a_3$$

whose middle term is $a_2 = 45$ and all whose terms are integers?

Problem 5.

LAST, FIRST (PRINTED)

ID

ANSWER

Problem 5. Let $p(x)$ be a polynomial such that

$$p(3x - 2) = 9x^2 + 6x + 1.$$

What is the smallest value v for which $p(v) = 0$?

Problem 6.

LAST, FIRST (PRINTED)

ID

ANSWER

Problem 6. What is the value of the fraction

$$\frac{1 + 3 + 5 + \cdots + 2023 + 2025}{2027 + 2029 + \cdots + 4049 + 4051},$$

where the entries of both numerator and denominator are in arithmetic progression.

Problem 7.

LAST, FIRST (PRINTED)

ID

ANSWER

Problem 7. Two circles, C_1 and C_2 , with respective radii of 8 and 18, are tangent at a point A . A common tangent line, ℓ , touches the circles at distinct points B and C . Find the length of the segment BC .

Problem 8.

LAST, FIRST (PRINTED)

ID

ANSWER

Problem 8. What is the number of three term arithmetic progressions

$$1 \leq a_1 \leq a_2 \leq a_3$$

all whose terms are elements of the set $\{1, 2, \dots, 99, 100\}$?

Problem 9.

LAST, FIRST (PRINTED)

ID

ANSWER

Problem 9. Jenny has a funny way of counting till 10. She always starts with 1. However, instead of simply calling out 2, she randomly calls out a number from 2 to 10 with equal probability. She continues in this manner, randomly calling out one of the numbers she has not called out with equal probability, until she calls out 10, at which point she stops. For example, one day she might count

1, 7, 2, 10.

What is the expected value of the sum of the numbers that she will end up saying out loud?

Problem 10.

LAST, FIRST (PRINTED)

ID

ANSWER

Problem 10. Let x be a positive integer. In base nine, the sum of its digits is 8; in base six, the sum of its digits is 5. What is the smallest possible value of x ?

WARNING

Do NOT open this booklet.

Flip it over.