COLLEGE *of*
CHARLESTON
DEPARTMENT OF MATHEMATICS

1. Assume $\pi = \dfrac{22}{7}$. If a hollow gold sphere with the shell 2 centimeters thick has an outer diameter of 12 centimeters, and one cubic centimeter of gold has a mass of 30 grams, what is the mass of the hollow gold sphere? Give your answer rounded to the nearest kilogram.

2. How many sets of integers $\{a, b\}$ are there where $1 \le a \le 100$, $1 \le b \le 100$, $a \neq b$, and $a + b \le 101$?

3. Write an equation of the straight line in slope-intercept form passing through the point $(3, 3)$ and the intersection of two straight lines $2x + 3y - 5 = 0$ and $x - 2y + 1 = 0$.

4. Find the 1000$^{\text{th}}$ term in the sequence:

$$1, 2, 3, 4, 5, 8, 7, 16, 9, 32, 11, \ldots$$

5. Find the 100$^{\text{th}}$ term in the sequence:

$$1, 1, 1, 2, 2, 1, 1, 2, 3, 3, 2, 1, \ldots$$

TEAM BRAINSTORMING INSTRUCTIONS

1. A team consists of 4 students from a school. The team members will work together to solve several problems chosen from different topics.

2. **No electronic devices** may be used during the competition.

3. Students may not have any other assistance. No notes nor books are allowed. No other person may assist the team members. Any violation of the rules will result in disqualification.

4. **The Team Captain** picks up the envelope containing the problems.

5. The team works together for at most 30 minutes to solve the problems. As soon as the team completes all the problems, or when time is up, the Team Captain returns the form with the final answers only to the proctor.

6. The judges will consider the solutions in the order in which they are received. The first team with the maximum number of correct answers will be selected as the winner. Decisions of the judges will be final.

FORM FOR SOLUTIONS

SCHOOL NAME: _____

TEAM MEMBERS: Print neatly.

1. _____   3. _____

2. _____   4. _____

SOLUTIONS:

1. _____

2. _____

3. _____

4. _____

5. _____