RAM Maths Circle

March 15, 2026

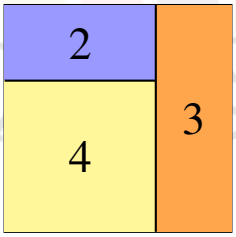
Nagpur

Introduction

In today's session, we explored two interesting mathematical puzzles: Mondrian Art puzzles and Bubbling Cauldrons. We began with Mondrian puzzles, where a square is divided into rectangles and we think about their areas and patterns. Then we looked at Bubbling Cauldrons, where numbers change step by step according to simple rules. The goal of this session was to show how mathematical ideas can be explored through puzzles, patterns, and creative thinking.

Mondrian Art Puzzles

Problem: You're Mondrian's mathematical boss. Instead of allowing Mondrian to randomly draw rectangles and colors -you lay out requirements: 1) Mondrian must cover an N by N canvas entirely with rectangles. 2) Every rectangle in the painting must have different dimensions. 3) Mondrian must use as few colors as possible, and rectangles with the same color cannot touch one another. Under these rules, Mondrian must try to minimize his score. A painting's score is the area of its largest rectangle minus the area of its smallest rectangle.



During the Mondrian Art puzzle activity, we started with a 3×3 grid and slowly explored larger grids up to 7×7. Students observerd the following observations :-

1. In 3×3 grid the minimum area possible is 2 unit square.
2. In 4×4 grid the minimum area possible is 4 unit square.
3. In 5×5 grid the minimum area possible is 4 unit square.
4. In 6×6 grid the minimum area possible is 5 unit square.
5. In 7×7 grid the minimum area possible is 7 unit square.

Bubbling Cauldrons

0.1 Problem :

You can place your numbers in either of the two cauldrons. You must first start by placing the number 1 into a cauldron, then 2, then 3, and so on... You cannot skip any numbers! But if any two numbers in a cauldron add up to another number in their cauldron, they explode! The cauldron empties, and you have to start over from 1.

Objective:

What is the largest number you can place into the two cauldrons without exploding?

0.2 Problem :

You can place your numbers in any of the three cauldrons. You must first start by placing the number 1 into a cauldron, then 2, then 3, and so on... You cannot skip any numbers. But if any two numbers in a cauldron add up to another number in their cauldron,they explode! The cauldron empties, and you have to start over from 1.

Objective:

What is the largest number you can place into the three cauldrons without exploding?

0.3 Problem :

You can place your numbers in either of the two cauldrons. You must first start by placing the number 1 into a cauldron, then 2, then 3, and so on... Now, if any three numbers in a cauldron add together to make another number in the same cauldron, they explode! The cauldron empties, and you have to start over from 1.

Objective:

What is the largest number you can place into the two cauldrons without exploding?

0.4 Problem :

You can place your numbers in any of the two cauldrons. Now you first start by placing the number 2 into a cauldron, then 3, then 4, and so on... However, if any two numbers in a cauldron add together to make another number in the same cauldron, they explode! The cauldron empties, and you have to start over from 2.

Objective:

What is the largest number you can place into the cauldrons starting from 2 ?

0.5 Problem :

Start with the number 3 and find the largest number you can place into the cauldrons. After you determine the largest number you can fit into the cauldrons first starting from 3, try starting form 4, then 5, then so on...

Objective:

What is the largest number you can place into the two cauldrons starting from n? Find an expression for the largest number depending on your starting number n.