Meeting 2 Student’s Booklet

A TRIP TO ITALY
PART 2

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1 The Forest of Binbaum

Which type of tree do you like? It will be in Binbaum!

Choose a value of $N$ from the following options: 3, 4, 5 or 6.

$\textbf{N: }$ 

(a) What is $N + 1/N$?

In what follows, use the selected value of $N$.

In the Forest of Binbaum, there are lots of trees, classified according to the following three characteristics:

**Color:** Every tree has either lavender or orange leaves (but not both).

**Shape:** All trees have a round shape or a conical shape (but not both).

**Glow:** Some trees glow in the dark, and some do not glow in the dark.

Binbaum is so diverse that there are always $N$ trees of every imaginable choice of characteristics.

For example, there are exactly $N$ trees that are lavender, round and glow in the dark. Also, there are exactly $N$ trees that are orange, round and do not glow in the dark (And so forth, with all imaginable possible combinations). 

Continues...
Example: Jim likes trees that are conic, glow in the dark and have orange leaves. If he goes to Binbaum, he will find exactly $N$ such trees!

(b) How many trees can be in the forest? Is there a unique answer? Explain why.

(c) What fraction of the total number of trees in Binbaum are rounded? How do you know this?

(d) Challenge

A tree is called an “Antreeter tree” if it is conical or glows in the dark. Count the number of Antreeter trees in Binbaum Forest.

Did you know...

In mathematics, when we use OR we allow the possibility for both things to happen. For example, if a tree is conical and glows in the dark, then this tree is an Antreeter tree.
Pizza

Marco, Alessia and Bruno are hungry; knowing that Pizza is very tasty, they decide to share a pizza. Each friend has different tastes, however.

Our friends have five choices for the toppings:

Basil (B), cheese (C), mushrooms (M), olives (O) and tomato (T).

- Alessia wants mushrooms and basil. She dislikes pizzas which have both cheese and olives.
- Marco wants mushrooms or cheese, but no tomato.
- Bruno insists that a good pizza should have cheese or tomato.

Pleasing everyone

Which toppings should be chosen to make all three friends happy, according to the above?

Did you know...

In mathematics, when we use OR we allow the possibility for both things to happen. For example, Marco wants mushrooms or cheese, so he would be OK if a pizza has both mushrooms and cheese.

Write your process and answers in your notebook

Continues...
Our friends take too long to make up their mind, so the waiter decides to order for them. He comes with the following pizza, having 7 slices of different sizes:

What fraction of the pizza does each friend like?

- Alessia
- Marco
- Bruno

Write your process and answers in your notebook.
Pipes of ONE

Put these 12 fraction tiles into the four pipes (3 tiles per pipe) so that the sum of the fractions in each pipe is equal to 1.

Ex: The set \{ \frac{4}{15}, \frac{1}{3}, \frac{2}{5} \} can go into one pipe because:

\[
\frac{4}{15} + \frac{1}{3} + \frac{2}{3} = \frac{4}{15} + \frac{5}{15} + \frac{6}{15} = \frac{4+5+6}{15} = \frac{15}{15} = 1.
\]

It may help to do calculations in your notebook.
Calcio Practice

Happily fed, our friends embrace the Italian culture and go see the Azzurri, the National Soccer Team, which is practicing for the World Cup...

The starting eleven players of the Azzurri wear jerseys with numbers from 1 to 11. There is a substitute player wearing 0. We want to split the Azzurri into two teams of 6 players each to play a practice game. We do so in a way that the sum of the T-shirt numbers of the first team is equal to the sum of the T-shirt numbers of the second team.

Dividing the Squad in two teams

1. Separate the players in two teams of 6 players each so that the described condition is satisfied.

Players 10 and 11 together

2. Find the number of ways to split the Azzurri into two teams as in part a, so that the players 0, 10 and 11 end up on the same team.

Write your process and answers in your notebook.
**Triangular Numbers**

Triangular Numbers are those which can be represented as dots of an equilateral triangle. The first six triangular numbers are:

- \( T_1 = 1 \)
- \( T_2 = 3 \)
- \( T_3 = 6 \)
- \( T_4 = 10 \)
- \( T_5 = 15 \)
- \( T_6 = 21 \)

(a) Can you easily find the values of \( T_7 \) and \( T_8 \)?

(b) What would be \( T_{11} \)?

(c) How does your answer in (b) relate with the Calcio Practice?

**History Fact**

Triangular Numbers were known by the Pythagoreans as early as 496 BCE. It was 800 years before Euclid's Elements!

**DRILL**

Find the following sums without adding all terms...

1. \( 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12. \)
2. \( 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12. \)
3. \( 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11. \)
4. \( 2 + 4 + 6 + 8 + 10 + 12 + 14 + 16 + 18 + 20 + 22 + 24. \)
5. \( 3 + 6 + 9 + 12 + 15 + 18 + 21 + 24 + 27 + 30 + 33 + 36. \)
6. \( 1 + 16 + 2 + 15 + 3 + 14 + 4 + 13 + 5 + 12 + 6 + 11 + 7 + 10 + 8 + 9. \)