

Paraguay Mathematical Olympiad 2002

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- 1 There are 12 dentists in a clinic near a school. The students of the 5th year, who are 29, attend the clinic. Each dentist serves at least 2 students. Determine the greater number of students that can attend to a single dentist .

- 2 In the rectangular parallelepiped in the figure, the lengths of the segments EH , HG , and EG are consecutive integers. The height of the parallelepiped is 12. Find the volume of the parallelepiped.
<https://cdn.artofproblemsolving.com/attachments/6/4/f74e7fed38c815bff5539613f76b0c4ca9171.png>

- 3 With three different digits, six-digit numbers are written, multiples of 3. One of the the digits are in the unit's place, another in the hundred's place, and the third in the remaining places. If we take out two units from the hundred's digit and add these to the unit's digit, the number is left with all the same digits. Find the numbers.

- 4 Find all natural numbers n for which $n + 195$ and $n - 274$ are perfect cubes.

- 5 In a trapezoid $ABCD$, the side DA is perpendicular to the bases AB and CD . Also $AB = 45$, $CD = 20$, $BC = 65$. Let P be a point on the side BC such that $BP = 45$ and let M be the midpoint of DA . Calculate the length of PM .