Paraguay Mathematical Olympiad 2005

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1 With the digits $1, 2, 3, ..., 9$ three-digit numbers are written such that the sum of the three digits is 17. How many numbers can be written?

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2 If you multiply the number of faces that a pyramid has with the number of edges of the pyramid, you get 5.100. Determine the number of faces of the pyramid.

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3 The complete list of the three-digit palindrome numbers is written in ascending order:

$$101, 111, 121, 131, ..., 979, 989, 999.$$

Then eight consecutive palindrome numbers are eliminated and the numbers that remain in the list are added, obtaining 46.150. Determine the eight erased palindrome numbers .

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4 In the expression $t = \frac{8a+1}{b}$ where a, b, t are positive integers, where $b < 7$. Determine the values of a and$b$ that allow to obtain t under the established conditions.

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5 Given a chord PQ of a circle and M the midpoint of the chord, let AB and CD be two chords that pass through M. AC and BD are drawn until PQ is intersected at points X and Y respectively. Show that X and Y are equidistant from M.
