

**Paraguay Mathematical Olympiad 2004**

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- 1 Stairs are built by laying bricks as shown in the figure. If you have 2004 bricks to build a staircase:
  - a) How many steps (= escalones) will the ladder have?
  - b) How many bricks will there be left over?

<https://cdn.artofproblemsolving.com/attachments/4/b/c1b80b374daeda4e33e1bb45be1d11f4b8959.png>

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- 2 Determine for what values of  $x$  the expressions  $2x + 2, x + 4, x + 2$  can represent the sidelengths of a right triangle.

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- 3 In an equilateral triangle  $ABC$ , whose side is 4, the line perpendicular to  $AB$  is drawn through the point  $A$ , the line perpendicular to  $BC$  through point  $B$  and the line perpendicular to  $CA$  through point  $C$ . These three lines determine another triangle. Calculate the perimeter of this triangle

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- 4 In a square  $ABCD$ ,  $E$  is the midpoint of  $BC$  and  $F$  is the midpoint of  $CD$ . Prove that  $AF$  and  $AE$  divide the diagonal  $BD$  in three equal segments.

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- 5 We have an integer  $A$  such that  $A^2$  is a four digit number, with 5 in the ten's place . Find all possible values of  $A$ .