

Paraguay Mathematical Olympiad 2019

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- 1 Elías and Juanca solve the same problem by posing a quadratic equation. Elijah is wrong when writing the independent term and gets as results of the problem -1 and -3 . Juanca is wrong only when writing the coefficient of the first degree term and gets as results of the problem 16 and -2 . What are the correct results of the problem?

- 2 Nair has puzzle pieces shaped like an equilateral triangle. She has pieces of two sizes: large and small.

<https://cdn.artofproblemsolving.com/attachments/a/1/aedfbfb2cb17bf816aa7daeb0d35f46a79b6a.jpg>

Nair build triangular figures by following these rules: • Figure 1 is made up of 4 small pieces, Figure 2 is made up of 2 large pieces and 8 small, Figure 3 by 6 large and 12 small, and so on. • The central column must be made up exclusively of small parts. • Outside the central column, only large pieces can be placed.

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Following the pattern, how many pieces will Nair use to build Figure 20?

- 3 Let \overline{ABCD} be a 4-digit number. What is the smallest possible positive value of $\overline{ABCD} - \overline{DCBA}$?

- 4 Find the largest positive integer n such that $n^2 + 10$ is divisible by $n - 5$.

- 5 A circle of radius 4 is inscribed in a triangle ABC . We call D the touchpoint between the circle and side BC . Let $CD = 8$, $DB = 10$. What is the length of the sides AB and AC ?