

THE POLYNOMIAL GAME

$$a_0 + a_1x + a_2x^2 + a_3x^3 + \ldots + a_nx^n$$

$$0\leq a_i\leq 2$$

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The Challenge: Determine all the coefficients.

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You can ask for the value of the polynomial.

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The Challenge: Determine all the coefficients.

You can ask for the value of the polynomial.

You are allowed only one question.



$$a_0 + a_1 3 + a_2 3^2 + a_3 3^3 + \dots + a_n 3^n$$

Consider the value of the polynomial at three.

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Write  $D$  in base 3.

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Let  $p(3) = D$ .

Write  $D$  in base 3.

This gives you all the coefficients.

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Determine all the coefficients.

You can ask for the value of the polynomial.

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All the coefficients are natural numbers.

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How many questions will you need before you can determine the coefficients?