Math Diversion Problem 494

P. Reany

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With me, everything turns into mathematics.
— Rene Descartes
(P.S. I calculate; therefore I am.)

The problem is found at:

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Source: https://indico.cern.ch/event/726779/contributions
/2991244/attachments/1642552/2727515
/complex_numbers_exercises.pdf
Title: Complex numbers- Exercises with detailed solutions
 Presenter:  CERN
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1 The Problem

Given the relation

$$P(z) = z^3 - z^2 + z + 1 + a\,, \tag{1}$$

find the value of a that makes $-i$ a root of $P(z)$.

2 The Solution

Our goal is to set $P(-i) = 0$. Then

$$P(-i) = (-i)^3 - (-i)^2 + (-i) + 1 + a = 0\,. \tag{2}$$

Simplifying one step, gives us

$$i + 1 + (-i) + 1 + a = 0\,. \tag{3}$$

So, we see that we require

$$a = -2\,. \tag{4}$$