

Math Diversion Problem 281

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The definition of a good mathematical problem is the mathematics
it generates rather than the problem itself.
— Andrew Wiles

The YouTube video is found at:

Source: <https://www.youtube.com/watch?v=buI2Z5JGr24>
Title: I Solved An Equation With z and \bar{z} |
Problem 86
Presenter: aplusbi

1 The Problem

Given the relation

$$z + zi + 1 = \bar{z}, \tag{1}$$

find the real values of z .

2 The Solution

Note: We will need the **identity** $(1 + i)(1 - i) = 2$.

First, let's do some rearranging on the Given relation.

$$z(1 + i) = \bar{z} - 1. \tag{2}$$

Now, we multiply through by $(1 - i)$ and then use the identity above.

$$2z = \bar{z}(1 - i) - (1 - i). \tag{3}$$

Next, let's take the complex conjugate of (2) and substitute its result into (3) (to get rid of the \bar{z}), to get

$$2z = z - 1 - (1 - i). \tag{4}$$

Finally, we just simplify.

$$z = -2 + i. \tag{5}$$