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The main objective of our research was to ascertain the number of integer coefficients, such as 0 1 2 3 4..., needed to represent all Gaussian integers using $1 + i$ as a base. After identifying that number, we wanted to produce a method that would convert any Gaussian integer to base $1 + i$. Using calculations performed by MatLab, we found that four coefficients, 0 1 2 and 3, are needed to represent every Gaussian integer. However, unlike for integer bases, the subsequent representations, even using only three coefficients, are not unique. We were also able to come up with an algorithm to convert any Gaussian integer to base $1 + i$. Further research on this subject matter will include the investigation of different types of coefficients and/or a different Gaussian integer as a base. (Received September 22, 2006)