New Directions: Eisenstein Series

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For the remainder of the year I would like to outline simple problems to work on.

The goal is proficiency passing from problems we care about (often stated over $\mathbb{Z}$ or $\mathbb{Q}$) and moving over to the real analysis problem.

Then I will complian the argument is disorganized and try to find a geometric problem entangled there.

Likewise we can try to take some modern number theory (such as modular forms) whose translations into English are promising.

Ex #1 find $x, y, z \in \mathbb{Z}$ with $|x^2 + y^2 - \sqrt{2}z^2| < 10^{-6}$

The goal is not really to solve any conjectures yet, sinc much energy will be spent deciphering notations and jargon. Why bother?

I believe there is new phenomenon embedded in modern number theory, with no classical counterpart, that can still be stated in the classical language.

Much of my use of the standard number theory argot will be wrong. Because it is too difficult.

$$E_a(z|\psi) = \sum_{\gamma\in\Gamma_{\mathfrak{a}}\backslash\Gamma} \psi\Big(\mathrm{Im}(\sigma_{\mathfrak{a}}^{-1}\gamma z)\Big)\ \chi(\gamma^{-1})\ P_{\mathfrak{a}}$$

Is this something we care about? It might be I can't tell.

There are many computations of this type and I can only consider a few. In fact, I have missed so many to my embarassment I have to start over.
