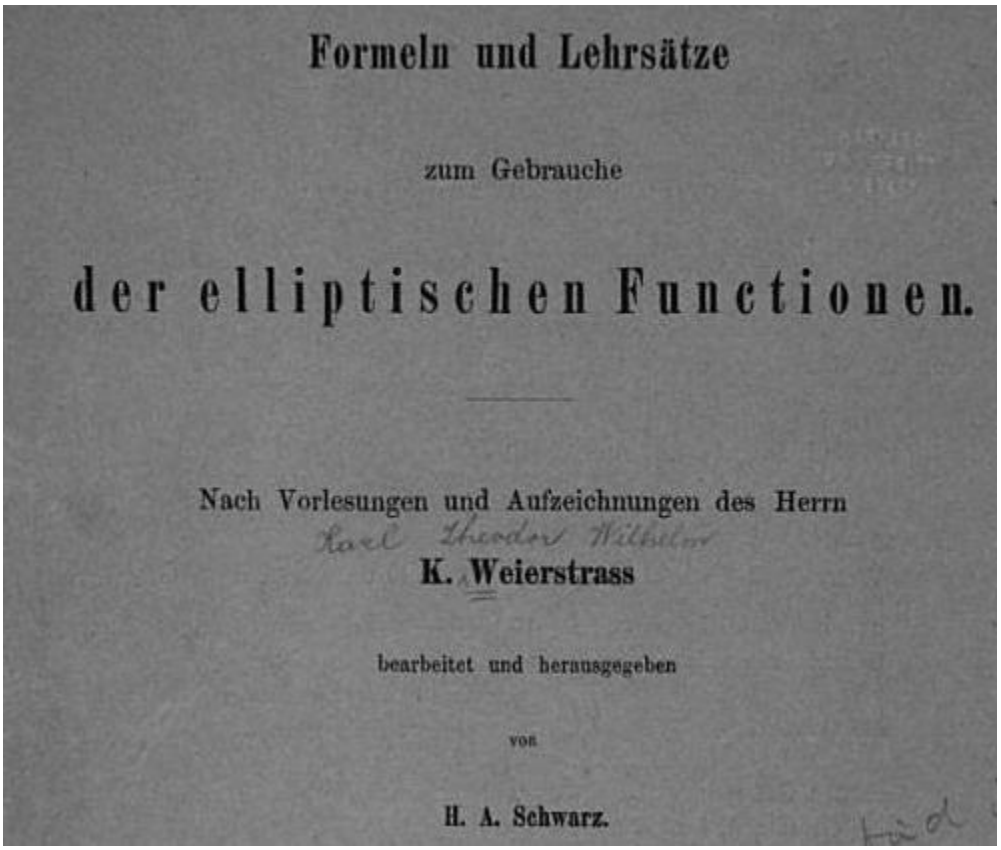
The Weierstrass p-function symbol PhL 11.17.10

- We start with the WW comment on this p function stuff

† *Werke*, II. (1895), pp. 245–255. The subject-matter of the greater part of this chapter is due to Weierstrass, and is contained in his lectures, of which an account has been published by Schwarz, *Formeln und Lehrsätze zum Gebrauche der elliptischen Funktionen, Nach Vorlesungen und Aufzeichnungen des Herrn Prof. K. Weierstrass* (Berlin, 1893). See also Cayley, *Journal de Math.* x. (1845), pp. 385–420 [*Math. Papers*, I. pp. 156–182], and Eisenstein, *Journal für Math.* xxxv. (1847), pp. 137–184, 185–274.

So this guy Schwarz "wrote up" Weierstrass's lectures and in this 1885 book the symbol appears. I was able to find the above reference as a scanned google book here (Formulas and Theorems on the use of the elliptic functions, adapted from Lectures and Notes of Herr K. Weierstrass)

http://books.google.com/books?id=wj4LAAAAYAAJ&printsec=frontcover&dq=formeln+und+lehrsatze&source=bl&ots=um7yQEIJZO&sig=L8wH5CXito1CKYgJ_yTDIpFW9hw&hl=en&ei=lzHkTN3FFYuisQP12IFn&sa=X&oi=book_result&ct=result&resnum=4&ved=0CCoQ6AEwAw#v=onepage&q&f=false



Formeln und Lehrsätze

zum Gebrauche

der elliptischen Functionen.

Nach Vorlesungen und Aufzeichnungen des Herrn
Karl Theodor Wilhelm
K. Weierstrass

bearbeitet und herausgegeben

von

H. A. Schwarz.

Göttingen.
Dieterichsche Universitäts-Buchdruckerei (W. Fr. Kaestner).
1885.

in which we see the p function defined as follows:

Die Function $\wp u$.

9.

Mit der Function σu ist die Function $\wp u = \wp(u|\omega, \omega') = \wp(u; g_2, g_3)$ durch die Gleichung

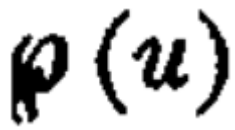
$$\wp u = -\frac{d^2}{du^2}\log\sigma u \tag{1.}$$

verbunden. Es bestehen daher die Gleichungen

$$\wp u = \frac{1}{u^2} + \sum{}'_w\left(\frac{1}{(u-w)^2} - \frac{1}{w^2}\right) \qquad \left(\begin{matrix} w = 2\mu\omega + 2\mu'\omega' \\ \text{ausgenommen } w = 0\end{matrix}\right) \tag{2.}$$

and there is "that p thing" Other functions like the σ function have elaborate script names as well.

- In WW this letter appears this way, and it appears somewhat bolded.



$$\wp(u) = \lambda + \tfrac{1}{3}(a^2 + b^2 + c^2),$$

- And now, a paragraph concerning German fonts used for printing.

Black letter, also known as **Gothic script** or **Gothic minuscule**, was a script used throughout Western Europe from approximately 1150 to well into the 17th century. It continued to be used for the German language until the 20th century. Fraktur is a notable script of this type, and sometimes the entire group of faces is known as Fraktur. Black letter is sometimes called **Old English**, but it is not to be confused with the Old English language, despite the popular, though mistaken, belief that the language was written with black letter. The Old English (or Anglo-Saxon) language predates black letter by many centuries, and was itself written in the insular script.

- In W&W, the Weierstrass elliptic function is written with a very strange looking "p" . I think this is a sort of script version of the lower case German black letter p (in its origin)



http://www.beerstein.net/articles/alpha.htm

- Amazingly, wiki has an entry on this subject

Weierstrass p

From Wikipedia, the free encyclopedia

In mathematics, the **Weierstrass p** (℘, or ℘ at a larger font size, or **℘** in bold form, or *℘* in italicized form, a stylized letter p), also called **pe**, is used for the Weierstrass's elliptic function. It is occasionally used for the power set,[1] although for that purpose a cursive capital, rather than lower-case, *p* is more widespread. It is named after the German mathematician Karl Weierstrass.

Its Unicode code point is U+2118 ℘ SCRIPT CAPITAL P (HTML: ℘ ℘). The naming is incorrect, because it is always a lowercase letter, but this error is not corrected in later versions in order to keep the Unicode standard stable.[2] The TeX code for this character is `\wp`.



Weierstrass p

- One person says http://www.mai.liu.se/~halun/complex/elliptic/

"This is Weierstrass's ``P function. According to tradition, the P should always be written with the fanciest font available! "

- The unicode standard has included this character as code 2118, (this from a PDF I saved)

2118 ℘ SCRIPT CAPITAL P
= Weierstrass elliptic function
• actually this has the form of a lowercase calligraphic p, despite its name

That quoted author found something in **Lucida Sans Unicode code 2118** which appears in my font viewer, Letters like this don't appear in the "insert symbol" dialog unless you type in something like 2118 unicode, then from then on it shows you ALL the glyphs. They call this a "script capital p" to wit: ℘ **℘** where the second is bolded.

Bateman uses this ℘(z) on page 328. If I don't bold it, it looks too light, but if I do, it is **℘**(z) which looks darker than Bateman, but is very close to how it appears in W&W:

$$\wp(u) = \lambda + \tfrac{1}{3}(a^2 + b^2 + c^2),$$

$\wp(z) = \lambda + (1/3)(a^2 + b^2 + c^2)$ // close enough!

- A&S just use a capital script P instead: $\mathcal{P}(u)$

- GR7 uses a non-bolded form

$$\int \wp(u)\, du = -\zeta(u)$$

- I cannot think of any other function where you are required to use something other than a regular letter or a Greek letter.

- I do wonder where this character was first used. Probably in his lectures, Weierstrass used such a symbol in his work in the blackboard (his slate board). Probably it was Schwarz who first printed the symbol?

- W&W's Cayley 1847 reference exists in collected math papers which I am now bringing in. This is the earliest item in the WW reference list I quote above. But it's in French and I don't see the p function appearing in it in any form. So forget it!