Compting with p-adic numbers in pari

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commandline:~> gp
Reading GPRC: /etc/gprc ...Done.

                GP/PARI CALCULATOR Version 2.1.5 (released)
                     i386 running linux 32-bit version
               (readline v4.3 enabled, extended help available)

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Type ? for help, \q to quit.
Type ?12 for how to get moral (and possibly technical) support.

   realprecision = 28 significant digits
   seriesprecision = 16 significant terms
   format = g0.28

parisize = 4000000, primelimit = 500000
?
? \\ find p-adic expansions of some rational:
? 1/2 + O(2^8)
%1 = 2^-1 + O(2^8)
? 1/2+O(3^8)
%2 = 2 + 3 + 3^2 + 3^3 + 3^4 + 3^5 + 3^6 + 3^7 + O(3^8)
? 1/2+O(5^8)
%3 = 3 + 2*5 + 2*5^2 + 2*5^3 + 2*5^4 + 2*5^5 + 2*5^6 + 2*5^7 + O(5^8)
? 1/2+O(7^8)
%4 = 4 + 3*7 + 3*7^2 + 3*7^3 + 3*7^4 + 3*7^5 + 3*7^6 + 3*7^7 + O(7^8)
?
? \\ list functions for padics:
? ???padic
algdep        factorpadic   padicappr     padicprec     polrootspadic

? ?factorpadic
factorpadic(x,p,r,{flag=0}): p-adic factorization of the polynomial x to
precision r. flag is optional and may be set to 0 (use round 4) or 1 (use
Buchmann-Lenstra).

? factorpadic(x^2 +1,3,8)
%5 =
[(1 + O(3^8))*x^2 + (1 + O(3^8)) 1]

? \\ this means -1 is not a square in Q_3
?
? factorpadic(x^2+1,5,8)
%6 =
[(1 + O(5^8))*x + (2 + 5 + 2*5^2 + 5^3 + 3*5^4 + 4*5^5 + 2*5^6 + 3*5^7 + O(5^8)) 1]

[(1 + O(5^8))*x + (3 + 3*5 + 2*5^2 + 3*5^3 + 5^4 + 2*5^6 + 5^7 + O(5^8)) 1]

? \\ this means -1 is a square in Q_5

? \\ you can also find the root as follows:

? -1+O(5^8)
%7 = 4 + 4*5 + 4*5^2 + 4*5^3 + 4*5^4 + 4*5^5 + 4*5^6 + 4*5^7 + O(5^8)
? sqrt(-1+O(5^8))
%8 = 2 + 5 + 2*5^2 + 5^3 + 3*5^4 + 4*5^5 + 2*5^6 + 3*5^7 + O(5^8)
?
```