Différence de logarithmes intégrals (Denise Vella-Chemla, 6.11.2018)

```python
import mpmath
from mpmath import *
from math import *

def prime(atester):
    pastrouve = True
    k = 2
    if (atester == 1):
        return False
    if (atester == 2):
        return True
    if (atester == 3):
        return True
    if (atester == 5):
        return True
    if (atester == 7):
        return True
    while (pastrouve):
        if ((k * k) > atester):
            return True
        else:
            if ((atester % k) == 0):
                return False
            else: k=k+1

def pi(x):
    nbpremiers = 0
    for y in range(1,x):
        if prime(y):
            nbpremiers=nbpremiers+1
    return nbpremiers

x=int(input())
res = li(x)-li(2)
a = pi(x)
b = int(sqrt(x))
c = li(b)-li(2)
resultat=res-(1.0/2.0)*c
print "li(x)-li(2) = %10.6f" %res
print "li(sqrt(x))-li(2) = %10.6f" %c
print "(li(x)-li(2))-(li(sqrt(x))-li(2)) = %10.6f" %resultat
print "pi(x) = %d" %a
erreur1 = (res-a)/a
erreur2 = (resultat-a)/a
print "(li(x)-li(2)-pi(x))/pi(x)  =   %10.6f" %erreur1
print "(li(x)-li(sqrt(x)-pi(x))/pi(x) = %10.6f" %erreur2
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```
1   x = 100
2   li(x)-li(2) = 29.080978
3   li(sqrt(x))-li(2) = 5.120436
4   (li(x)-li(2))-(li(sqrt(x))-li(2)) = 26.520760
5   pi(x) = 25
6   (li(x)-li(2)-pi(x))/pi(x)   =   0.163239
7   (li(x)-li(sqrt(x)-pi(x))/pi(x) = 0.060830
8
9   x = 1000
10  li(x)-li(2) = 176.564494
11  li(sqrt(x))-li(2) = 12.270067
12  (li(x)-li(2))-(li(sqrt(x))-li(2)) = 170.429461
13  pi(x) = 168
14  (li(x)-li(2)-pi(x))/pi(x)   =   0.050979
15  (li(x)-li(sqrt(x)-pi(x))/pi(x) = 0.014461
16
17  x = 10000
18  li(x)-li(2) = 1245.092052
19  li(sqrt(x))-li(2) = 29.080978
20  (li(x)-li(2))-(li(sqrt(x))-li(2)) = 1230.551563
21  pi(x) = 1229
22  (li(x)-li(2)-pi(x))/pi(x)   =   0.013094
23  (li(x)-li(sqrt(x)-pi(x))/pi(x) = 0.001262
24
25  x = 100000
26  li(x)-li(2) = 9628.763837
27  li(sqrt(x))-li(2) = 70.080798
28  (li(x)-li(2))-(li(sqrt(x))-li(2)) = 9593.723439
29  pi(x) = 9592
30  (li(x)-li(2))-pi(x)/pi(x)   =   0.003833
31  (li(x)-li(sqrt(x)-pi(x))/pi(x) = 0.000180
32
33  x = 1000000
34  li(x)-li(2) = 78626.503996
35  li(sqrt(x))-li(2) = 176.564494
36  (li(x)-li(2))-(li(sqrt(x))-li(2)) = 78538.221749
37  pi(x) = 78498
38  (li(x)-li(2)-pi(x))/pi(x)   =   0.001637
39  (li(x)-li(sqrt(x)-pi(x))/pi(x) = 0.000512
40
41  x = 10000000
42  li(x)-li(2) = 664917.359885
43  li(sqrt(x))-li(2) = 461.881189
44  (li(x)-li(2))-(li(sqrt(x))-li(2)) = 664686.419290
45  pi(x) = 664579
46  (li(x)-li(2)-pi(x))/pi(x)   =   0.000509
47  (li(x)-li(sqrt(x)-pi(x))/pi(x) = 0.000162
```