

```

1 from typing import List
2 from program10_1 import adds, subs
3
4 N = 200 # 求める桁数 5*N桁
5 DEG = 100000 # 桁数の基準
6
7 def main():
8     a = arctan(16, 5)
9     b = arctan(4, 239)
10
11     pi = subs(a, b, N, DEG)
12     print_result(pi)
13
14
15 def divsp(a: List[int], bunbo: int, idx: int) -> List[int]:
16     global N, DEG
17     # 除算
18     b = [0] * len(a)
19     amari = 0
20     for i in range(idx, N+1):
21         bunshi = amari * DEG + a[i]
22         b[i] = bunshi // bunbo
23         amari = bunshi % bunbo
24     return b
25
26
27 def print_result(a: List[int]):
28     print("%5u." % a[0], end="")
29     for i in range(1, N+1):
30         print("%05u" % a[i], end=" ")
31     print()
32
33
34 def arctan(n: int, d: int):
35     global N
36     a = init(0)
37     e = init(n)
38
39     # (**) の第 1 項の計算
40     e = divsp(e, d, 0)
41     a = adds(a, e, N, DEG)
42     p = top(e, 0)
43
44     # (**) の第 2 項以降の計算
45     i = 3
46     while p <= N:
47         e = divsp(e, d, p)
48         e = divsp(e, d, p)
49         f = divsp(e, i, p)
50         if i%4 == 1:
51             a = adds(a, f, N, DEG)
52         else:
53             a = subs(a, f, N, DEG)
54         p = top(e, p)
55         i += 2
56     return a
57
58
59 # 0 でない最左位置 p を探す
60 def top(a: List[int], p: int) -> int:
61     while p <= N and a[p] == 0:
62         p += 1
63     return p
64
65
66 # 値を初期化 a[0]=n で、それ以外は 0
67 def init(n: int) -> List[int]:
68     a = [n]
69     a.extend([0] * N)
70     return a
71
72
73 if __name__ == "__main__":
74     main()

```