

$$p_i(n) < C < p_c(n)$$

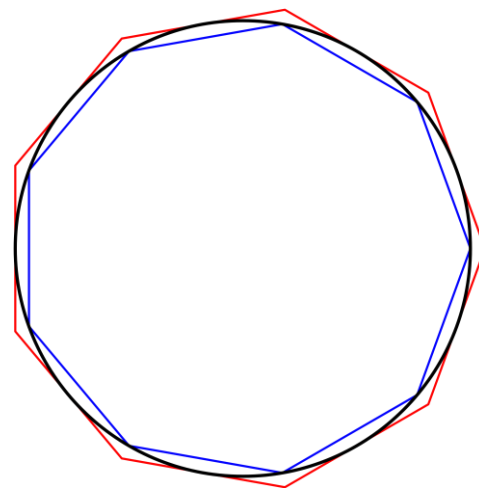
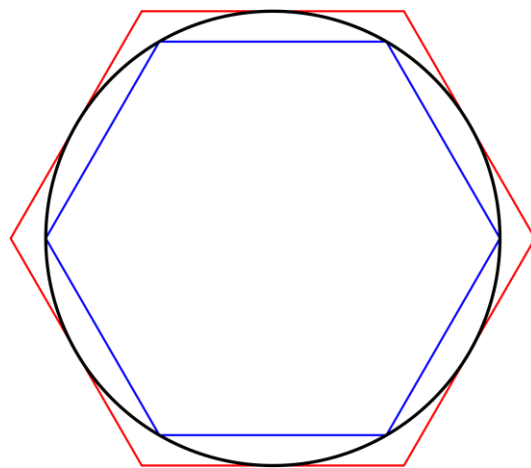


$$\frac{p_i(n)}{2} < \pi < \frac{p_c(n)}{2}$$



$$\frac{nL_i(n)}{2} < \pi < \frac{nL_c(n)}{2}$$

Si può fare di meglio:
Algoritmo di archimede



$$\overline{PQ_1} : \overline{HA} = \overline{OP} : \overline{OH}$$

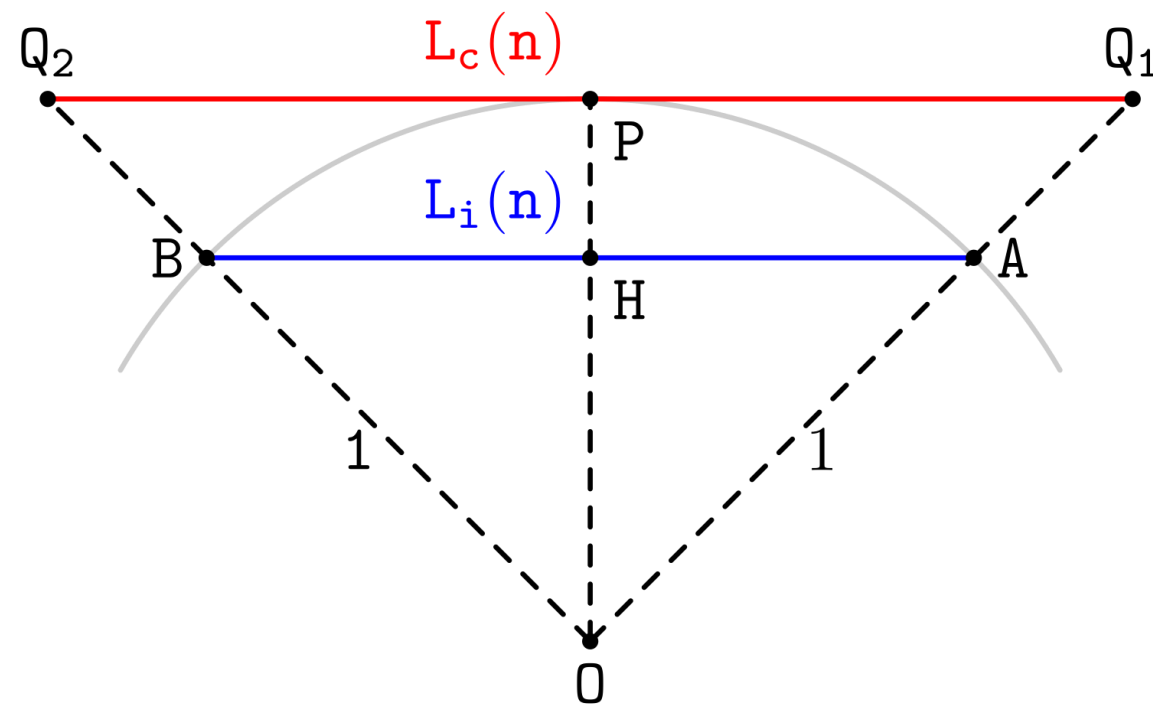
$$\overline{HA} \text{ vale } L_i(n)/2$$

$$\overline{OP} \text{ vale } 1$$

$$\overline{OH} = \frac{\sqrt{4 - L_i(n)}}{2}$$



$$L_c(n) = \frac{2L_i(n)}{\sqrt{4 - L_i(n)}}$$



$$L_c(n) = \frac{2L_i(n)}{\sqrt{4 - L_i(n)}}$$

$$L_i(2n) = \sqrt{2 - \sqrt{4 - L_i(n)^2}}$$

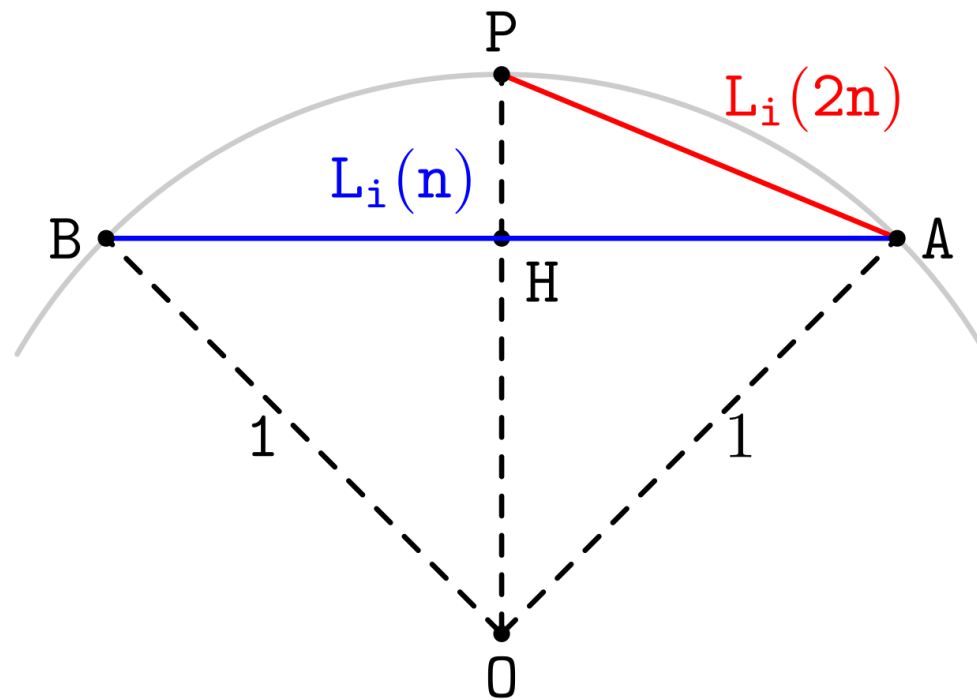
$$L_i(4) = 2\sqrt{2}$$

$$L_c(4)$$

$$L_i(8)$$

$$L_c(8)$$

⋮



Algoritmo

$$L_c(n) = \frac{2L_i(n)}{\sqrt{4 - L_i(n)}}$$

$$L_i(2n) = \sqrt{2 - \sqrt{4 - L_i(n)^2}}$$

```

1  L_i, L_c = 2**0.5, 2
2  iter_max, c = 10, 0
3  n = 4
4
5  while c < iter_max:
6      p_i, p_c = n*L_i/2, n*L_c/2
7      print(n, p_i, p_c)
8      L_i = (2 - (4-L_i**2)**0.5)**0.5
9      L_c = 2*L_i/(4-L_i**2)**0.5
10     c += 1
11     n *= 2

```

n	p_i	p_c
4	2.8284271247461903	4.0
8	<u>3.0</u> 614674589207187	<u>3.3</u> 13708498984761
16	<u>3.1</u> 21445152258053	<u>3.1</u> 825978780745285
32	<u>3.1</u> 365484905459406	<u>3.1</u> 517249074292573
64	<u>3.1</u> 40331156954739	<u>3.1</u> 441183852458905
128	<u>3.1</u> 41277250932757	<u>3.1</u> 42223629942441
256	<u>3.1</u> 415138011441455	<u>3.1</u> 41750369168811
512	<u>3.1</u> 415729403678827	<u>3.1</u> 416320807039733
1024	<u>3.1</u> 41587725279961	<u>3.1</u> 4160251025961
2048	<u>3.1</u> 41591421504635	<u>3.1</u> 415951177430244

Test di Primalità

$n > 2$
è primo?

ovvero

esiste un numero che divide n
che non sia 1 o lo stesso n ?

$$n \% d == 0$$

Algoritmo

Testare tutti i possibili divisori d

2 non divide n



$$n = 2 \cdot \lfloor n/2 \rfloor + 1$$



$\lfloor n/2 \rfloor$ non divide n

$$(\lfloor n/2 \rfloor + 1)2 > n$$



$$d \leq \lfloor n/2 \rfloor$$

Algoritmo

Si può fare di meglio? Se

$$n = p_0 p_1 \dots p_k$$

$$p_0 < p_1 < \dots < p_k$$



$$p_0 \leq \lfloor \sqrt{n} \rfloor$$

Implementazione in Python

```
1  n = 1231
2
3  d = 2
4  while d*d <= n and n%d != 0:
5      d += 1
6
7  if n%d == 0:
8      print(False)
9  else:
10     print(True)
```