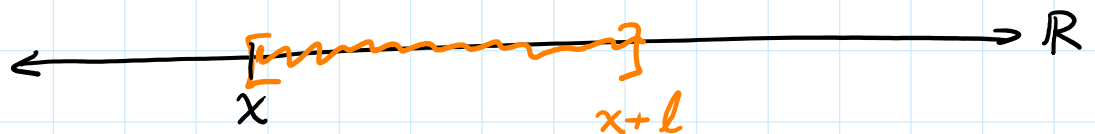


PRIME NUMBER THEOREM

$$\lim_{x \rightarrow \infty} \frac{\pi(x)}{\frac{x}{\ln(x)}} = 1 \quad \text{and} \quad \lim_{x \rightarrow \infty} \frac{\pi(x)}{\text{li}(x)} = 1$$

DENSITY OF PRIMES:

number of primes in interval
length of the interval



If the density of primes is $\frac{1}{\ln(x)}$, then
the count of primes up to x is

$$\text{li}(x) = \int_0^x \frac{1}{\ln t} dt \quad \leftarrow \text{"logarithmic integral"}$$

RIEMANN ZETA FUNCTION

$$\zeta(s) = \sum_{n=1}^{\infty} \frac{1}{n^s}$$

$$\zeta(2) = \frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \frac{1}{4^2} + \dots = \frac{\pi^2}{6}$$

$$\zeta(3) = 1.202 \dots = ??$$

$$\zeta(4) = 1.082 \dots = \frac{\pi^4}{90}$$

$$\zeta(4) = 1.082\dots = \frac{\pi^4}{90}$$

$$\zeta(5) = 1.0369\dots = ??$$