In[35]:= ```
(* Define the prime counting function π(x) *)
primePiFunction[x_] := PrimePi[x]
```

```
(* Precompute π(x/k) and π(x/(ek)) for k = 1, 2,
3, 4, 5 to optimize the function lFunction *)
precomputePrimePi[x_] := Module[{e = E, values1, values2},
 values1 = Table[primePiFunction[x / k], {k, 1, 5}];
 values2 = Table[primePiFunction[x / (e * k)], {k, 1, 5}];
 {values1, values2}
]
```

```
(* Define the function \mathcal{L}(x) using precomputed π values *)
lFunction[x_] := Module[{e = E, logX = Log[x], πValues},
 πValues = precomputePrimePi[x];
 (Total[πValues[[1]]]^2) - (e x / logX) Total[πValues[[2]]]
]
```

```
(* Evaluate the function for x = 10^m, where 4 ≤ m ≤ 7 *)
resultsL1 = Table[{10 ^ m, N[lFunction[10 ^ m]]}, {m, 4, 7}]
```

Out[39]=
$$\{\{10\,000, 5.44288 \times 10^6\}, \{100\,000, 3.18294 \times 10^8\},$$
$$\{1\,000\,000, 2.07209 \times 10^{10}\}, \{10\,000\,000, 1.45317 \times 10^{12}\}\}$$

In[40]:= ```
(* Evaluate the function for x = 10^m, where 8 ≤ m ≤ 11 *)
resultsL2 = Table[{10 ^ m, N[lFunction[10 ^ m]]}, {m, 8, 11}]
```

Out[44]=
$$\{\{100\,000\,000, -1.33038 \times 10^9\}, \{1\,000\,000\,000, -4.20769 \times 10^{10}\},$$
$$\{10\,000\,000\,000, -1.75064 \times 10^{12}\}, \{100\,000\,000\,000, -1.01174 \times 10^{14}\}\}$$

In[45]:= (* Evaluate the function for x = 10^m, where 12 ≤ m ≤ 14 *)
resultsL3 = Table[{10^m, N[lFunction[10^m]]}, {m, 12, 14}]

Out[46]=
$\{\{1\,000\,000\,000\,000, -4.35591 \times 10^{15}\},$
$\{10\,000\,000\,000\,000, -2.39437 \times 10^{17}\}, \{100\,000\,000\,000\,000, -1.47373 \times 10^{19}\}\}$

In[48]:= (* Evaluate the function for x = 10^m, where 15 ≤ m ≤ 16 *)
resultsL4 = Table[{10^m, N[lFunction[10^m]]}, {m, 15, 16}]

Out[49]=
$\{\{1\,000\,000\,000\,000\,000, -9.45264 \times 10^{20}\}, \{10\,000\,000\,000\,000\,000, -6.18017 \times 10^{22}\}\}$

Out[51]=
$Aborted

Out[52]=
$Aborted