Problem 5

First, we sum the probabilities

$$p_n = \frac{0.1}{n}$$

for $n \in [0, 12367] \subset \mathbb{Z}^+$ to ensure the result is normal (*close to 1*)

```
In [1]:  probSumNow = 0
         for i in range(12367):
             probSumNow += 0.1 / (i + 1)

         print(probSumNow)
```

1.0000043008275796

Since the sum of the probabilities is reasonably close to 1, we proceed to calculate the entropies using

$$H(x) = -\sum_{n=1}^{12367} \left\{ \frac{0.1}{n} \log_2 \left[\frac{0.1}{n} \right] \right\}$$

to obtain

```
In [3]:  import math

         entropySumNow = 0
         for i in range(12367):
             entropySumNow += - (0.1 / (i + 1)) * math.log2(0.1 / (i + 1))

         print(entropySumNow)
```

9.71625847652071