Task 01-01

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Question 1

For the given sequence, we claim the definition of $f(n)$ is the following:

$$f(n) = \frac{2^{1+n\%2} \cdot (-1)^{n-1}}{n + n\%2}$$

Question 2

Using the definition of $f(n)$ from above, we have the summation as follows:

$$\sum_{1000}^{n=1} f(n) = \ 6.792$$

Question 3

Using the definition of $f(n)$ from above, we have $f(-2.7)$ as follows:

$$f(n) = -\frac{2.894 + 3.984 \cdot i}{1.400}$$

Source Code

```
from fractions import Fraction

## Question 1
# Implementation of f(n)
def f(n):
  parity = n % 2
  numerator = (2 ** (1 + parity)) * ((-1) ** (parity+1))
  denominator = n + parity
  return (numerator, denominator)
```

```
# First print the sequence to check with the given sequence
for i in range (1, 13):
  val = f(i)
  num = val[0]
  denom = val[1]
  print (f"n: {i} → f(n): {num} / {denom}")

## Question 2
sum = 0
# Now we compute the sum to 1000
for i in range (1, 1001):
  val = f(i)
  sum += val[0] / val[1]
print (f"Summation: {sum}")

## Question 3
print (f"f(-2.7): {f(-2.7)}")
```