Asgn2 Write Up

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Analysis:

- The Euler formula is a sum of the series of $1/n^2$ as ‘n’ is incremented by one at each iteration; as ‘n’ reaches infinity, the sum becomes extremely smaller.

$$\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{1}{1^2} + \frac{1}{2^2} + \frac{1}{3^2} + \ldots = \frac{\pi^2}{6}$$

- The output of our program has a subtle difference between the computed approximation of Π than the <math.h> value for it.
- It returns the difference between the computed value vs the actual value which is a bit higher than other functions.

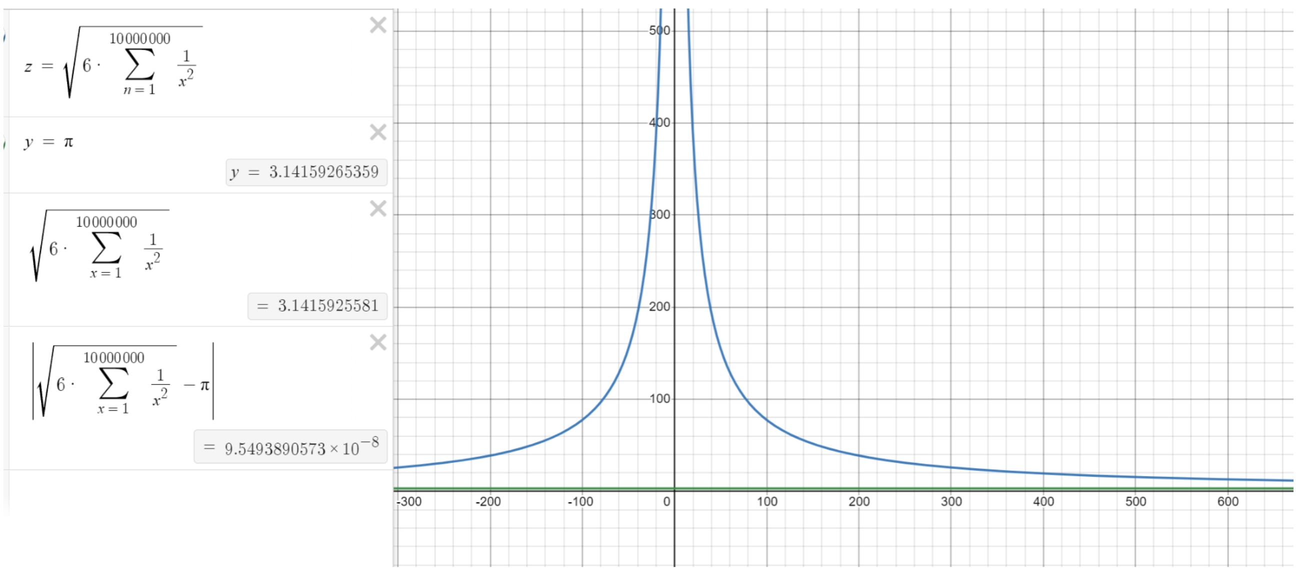
```
mvahabi@igloo:~/cse13s/asgn2$ ./mathlib-test -r -s
pi_euler() = 3.141592558096831, M_PI = 3.141592653589793, diff = 0.000000095492962
 terms = 10000000
mvahabi@igloo:~/cse13s/asgn2$
```

Reasoning:

- In our program, we have an end condition that stops calculating the sum of each new terms after the new term is as small as $1 * 10^{-14}$.

- That works because the first 10,000,000 terms in this series is greater than the $1 * 10^{-14}$.
- Therefore, the program returns a number that is very close to Π, but because the series does not actually reach infinity and ends at 10,000,000 terms, it is slightly off than of the built in math library value for Π.

Data:



- The blue line is a graph for the Euler's solution for pi and the green line is the value of Π.
- You can observe the difference in the values of the middle two sections of the table on the left, and also the computed difference on the bottom of that table.