Title

Alternating sum

Problem Description

Have the user enter a positive inter, n, representing the number of terms to compute. Compute the following sum:

$$S = \sum_{i=1}^{n} \frac{(-1)^i}{i^2}$$

Extra: After a large number of terms this sum eventually converges to a value. What this means is that once n gets very large, adding an additional term won't make S change very much. For the purposes of this assignment, we will assume that the series converges when the difference between successive terms is smaller than 10^{-3}. Write a program that determines how many terms it takes for the sequence to converge. **Note: the answer is approximately 30. You need to convince yourself of this with a computer program!**

Testing

Test Input	Expected Output
`1`	`-1`
`5`	`-0.838611`
`100`	`-0.822418`

Time Target

*** less than 10 minutes

** 10-15 minutes

* greater than 15 minutes

Expected target for extra portion: 10 minutes

Section

loops