Skipping squares revisited

[Award] **7 pts**

[Category] **Math**

For positive integer *k* (*k* > 1), we begin a sum *s* at 0 and repeatedly apply a process: we add one integer to *s* from 1 to *k* with equal probability. The process ends when *s* is a perfect square. For example, if *s* goes through 0, 2, 3, 5, 7, 9, the process ends at *s* = 9, and two squares 1 and 4 were skipped over.

Let *E*(*k*) be the expected number of perfect squares skipped over when the process finishes for parameter *k*. For example, *E*(2) = 0.6832612735 and *E*(10) = 4.9658004390, both rounded to 10 digits after the decimal point.

Find E(100). Give your answer rounded to 10 digits after the decimal point.

[Answer] **51.6273633930**