Problem of the Week 6: An Infinite Sum

The problem of finding the exact value of this infinite sum

$$\sum_{n=1}^{\infty} \frac{1}{n^2}$$

was considered by 17th century mathematicians, including Mengoli, Leibniz and Bernoulli. Unable to solve the problem, Jacob Bernoulli wrote:

If anyone finds and communicate to us that which thus far eluded our efforts, great will be our gratitude.

about this problem, in 1689. It was Euler, one of the greatest mathematicians of all times, who first established the remarkable identity

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

in 1735. Given Euler's formula, it is much easier to find the exact value of the similar sum

$$\sum_{n=1}^{\infty} \frac{1}{(2n-1)^2} = ?$$

Can you do that? [1]

[1] Posted: 11/07/04 Submit your answers (by e-mail or hard copy) before 4 pm on 11/19/04 to Noah Aydin, Mathematics Dept.