3. We know that

$$\tan^{-1}(1) = \frac{\pi}{4}.$$

Thus,

$$\pi = 4\int_0^1 \frac{1}{1+x^2}\, dx.$$

Is the series method of computing this integral a good way to evaluate π to 1 million decimal places?

Solution:
No. The series method gives, as in question 1,

$$\pi = 4(1 - 1/3 + 1/5 - 1/7 + - \cdots)$$

In order to compute π to 1 million decimal places, we would need the first omitted term above to be $< (1/8) \cdot 10^{-1000000}$. We'd have to use roughly the first $4 \cdot 10^{1000000}$ terms! (There are much more efficient ways of computing π to high accuracy.)