

# Solutions: Probability Theory by S.R.S Varadhan

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## Chapter 1. Measure Theory

### Exercise 1.11

There is a difference between almost everywhere convergence...

**Solution:** We let  $I_{2n} = (\frac{1}{2n}, 1]$  and  $I_{2n+1} = [0, \frac{1}{2n+1}]$ . We also let  $f_n(x) = \mathbb{1}_{I_n}(x)$ . Then we have that  $\lim_{n \rightarrow \infty} P[\omega : |f_n(\omega) - f(\omega)| \geq \epsilon] = 0, \forall \epsilon > 0$ .

### Exercise 1.12

But the following statement is true...

**Solution:**