Answers to exams

2012-12-18

Exercise 1: (a) $\frac{\pi^2}{3} + \sum_{n=-\infty}^{\infty} \frac{2}{n^2}(-1)^n e^{inx}$ (b) $-\pi^2/12$

Exercise 2: $|x|\, e^{-|x|} + e^{-|x|}$

Exercise 3: $e^{-\sqrt{3}|x|}/\sqrt{3}$

Exercise 4: $e^{-2t} \sum_{n=1}^{\infty} \frac{2(-1)^{n+1}}{n\pi} e^{-n^2 t} \sin(n\pi x)$

Exercise 5: $u(x, y) = e^{-y^2} f(x - y)$

Exercise 6: $e^{2x} + e^{-x} - 1$

2014-12-17

Exercise 1: (a) $\frac{\pi^2}{3} + \sum_{n=1}^{\infty} \frac{4}{n^2}(-1)^n \cos(nx)$

Exercise 3: (a) $\langle f, g \rangle := \int_{-1}^{1} f(x)\overline{g(x)}\, \mathrm{d}x$ (b) $\|f\| := \left(\int_{-1}^{1} |f(x)|^2\, \mathrm{d}x \right)^{1/2}$
(c) 2, 2/3, 2 (d) $\{1, x\}$

Exercise 4: $\frac{2}{\pi} - 1 + \sum_{n=1}^{\infty} \frac{2}{n\pi} e^{-n^2 t} \sin(nx)$

Exercise 5: $\frac{i \sin(\omega+1)}{\omega+1} - \frac{i \sin(\omega-1)}{\omega-1}$

Exercise 6: $\pi/16$