



LUND
UNIVERSITY

Fourier Analysis
Friday May 28, 2010
Time: 08.00–13.00

Centre for Mathematical Sciences
Mathematics, Faculty of Science

Answers

1. a)

$$u(x) \sim \frac{1}{\pi} + \frac{2}{\pi} \sum_{k=1}^{\infty} \frac{\sin k}{k} \cos(kx).$$

b) $\pi/2 - 1$.

2.

$$u(x, t) = \frac{1}{2} - \frac{1}{2} e^{-4t} \cos 2x.$$

3. $u(x) = 1/(2\pi(1 + x^2))$.

4. a) $\hat{f}(\xi) = 1/(1 + i\xi)^2$.

b) $\pi(1 - (1 + \lambda)e^{-\lambda})$.

5. a) $\lambda_n = -1/n$.

b) $\pi^3/4$.