

LINKÖPINGS TEKNISKA HÖGSKOLA

Matematiska institutionen

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**Svar till Tentamen TATA 27 Partial Differential Equations
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1.

$$u(1, 1) = \frac{7}{8}$$

2.

$$u(x, y) = x + \sum_{k=0}^{\infty} a_k e^{-2\lambda_k^2 t} \sin \lambda_k x,$$

where

$$\lambda_k = \frac{\pi(2k+1)}{4}$$

and

$$a_k = \frac{1 + \cos 2\lambda_k}{\lambda_k} - \frac{(-1)^k}{\lambda_k^2}$$

3. Apply the maximum principle to the function

$$u(x, y) - (x^2 + y^2)/4$$

4. $u(x) = (x^3 + 11x)/12$

5.

$$f''(x) = 2 \sum_{k=-\infty}^{\infty} \delta(x - k\pi) + h(x),$$

where $h(x) = (-1)^{k+1} \sin x$ for $x \in [k\pi, (k+1)\pi]$, $k = 0, \pm 1, \dots$