Rješenja ponovljenog prvog međuispita iz Matematike 3E i 3R
4.02.2010.

1. (3 boda)

$$S(x) = \frac{1}{2} - \frac{1}{\pi} \sum_{n=1}^{\infty} \frac{\sin(n\pi x)}{n}.$$

2. (3 boda)
a) (**1b**) Knjiga, str. 32, Parsevalova jednakost.
b) (**2b**)

$$\sum_{n=1}^{\infty} \frac{1}{n^4} = \frac{\pi^4}{90}.$$

3. (5 bodova)
a) (**4b**)

$$f(x) = \frac{2}{\pi} \int\limits_0^{\infty} \frac{\lambda \sin(\lambda x)}{\lambda^2 + 4}\, d\lambda.$$

b) (**1b**) Uvrstimo $x = 1$. Slijedi

$$\int\limits_0^{\infty} \frac{x \sin x}{x^2 + 4}\, dx = \frac{\pi}{2e^2}.$$

4. (3 boda)
a) (**1b**) Knjiga, str. 60.
b) (**2b**)

$$\int\limits_0^{\infty} t \cos\left(\frac{2t}{3}\right) e^{-2t}\, dt = \frac{9}{50}.$$

5. (3 boda)

$$f(t) \quad \circ\!\!-\!\!\!-\!\!\bullet \quad \frac{s}{s^2+1} + \frac{e^{-\frac{\pi}{2}s}}{s^2+1}.$$

6. (3 boda)

$$F(s) = \frac{s}{s^2 + 6s + 34} \quad \bullet\!\!-\!\!\!-\!\!\circ \quad \cos(5t)e^{-3t}u(t) - \frac{3}{5}\sin(5t)e^{-3t}u(t).$$

7. (5 bodova)

$$i(t) = -\frac{8}{17}e^{-2t}u(t-1) + \frac{8}{17}e^{-2}\cos\left(\frac{t-1}{2}\right)u(t-1) + \frac{2}{17}e^{-2}\sin\left(\frac{t-1}{2}\right)u(t-1).$$