Rješenja prvog međuispita iz Matematike 3E i 3R
21.10.2009.

1. (4 boda)
Potrebno je pokazati

- $\int_{-1}^{1} 1 \cdot \sin(n\pi x) = 0$
- $\int_{-1}^{1} 1 \cdot \cos(n\pi x) = 0$
- $\int_{-1}^{1} \cos(n\pi x)\sin(m\pi x) = 0$
- $\int_{-1}^{1} \cos(n\pi x)\cos(m\pi x) = 0, m \neq n$
- $\int_{-1}^{1} \sin(n\pi x)\sin(m\pi x) = 0, m \neq n$

2. (4 boda)
a) (**2b**) $S(x) = \frac{1}{3} + \frac{2\sqrt{3}}{\pi}\left(\cos x - \frac{1}{2}\cos 2x + \frac{1}{4}\cos 4x - \frac{1}{5}\cos 5x + ...\right)$
c) (**1b**) Suma je jednaka $S(0) = \frac{\pi}{3\sqrt{3}}$

3. (4 boda)
$f(x) = \int_{0}^{\infty} \frac{\cos(\lambda x)}{1+\lambda^2}$

4. (1 bod)
Knjiga str 67.

5. (4 boda)
a) (**2b**) Knjiga, str 81.
b) (**2b**) $F(s) = \frac{1}{s(1-e^{-2\pi s})}\left(1 - 2e^{-\frac{\pi}{2}s} + 2e^{-\frac{3\pi}{2}s} - e^{-2\pi s}\right)$

6. (4 boda)
$y(t) = \sin(t)u(t) + t\sin(t)u(t) + (t-\pi)\sin(t-\pi)u(t-\pi)$

7. (3 boda) $i(t) = u(t-3) - \frac{2}{\sqrt{3}}\sin\left(\frac{\sqrt{3}}{2}(t-3)\right)u(t-3)e^{-\frac{1}{2}(t-3)}$