Rješenja 1. međuispita iz Matematike 3E
23.11.2011.

1. **(c)** $S(2011 \cdot \pi) = S(\pi) = \frac{0-\pi}{2} = -\frac{\pi}{2}$ (točka prekida!)

2. **(a)** parna $\Rightarrow\ b_n = 0, \forall n \in \mathbb{N},\ \ S(x) = \frac{1}{2} + \sum_{k=0}^{\infty} \frac{4}{(2k+1)^2\pi^2} \cos((2k+1)\pi x)$
   (c) $\frac{\pi^4}{96}$

3. **(a)** neparna $\Rightarrow A(\lambda) = 0,\ \ \widetilde{f}(x) = \int_0^{\infty} \frac{2}{\pi} \left[\frac{\sin\lambda}{\lambda^2} - \frac{\cos\lambda}{\lambda}\right] \sin(\lambda x) d\lambda$
   (b) $am(\lambda) = |B(\lambda)| = \frac{2}{\pi} \left|\frac{\sin\lambda}{\lambda^2} - \frac{\cos\lambda}{\lambda}\right|$

5. **(c)** $Y(s) = F(s) \cdot \frac{1}{(s+1)^2+2^2} + \frac{s}{(s+1)^2+2^2}$
   $\Rightarrow\ y(t) = \frac{1}{2} f(t) * (e^{-t}\sin(2t)) + e^{-t}\cos(2t) - \frac{1}{2}e^{-t}\sin(2t)$

6. $F(s) = e^{-2s} \cdot \frac{1}{(s^2+s+1)(s+1)} = ...$(rastav na parcijalne razlomke...)$\Rightarrow$
   $f(t) = e^{-(t-2)}u(t-2) - e^{-\frac{1}{2}(t-2)}\cos(\frac{\sqrt{3}}{2}(t-2))u(t-2) + \frac{1}{\sqrt{3}}e^{-\frac{1}{2}(t-2)}\sin(\frac{\sqrt{3}}{2}(t-2))u(t-2)$.

7. $$\int_{e^{-1}}^{1} dy \int_{-\ln y}^{1} f(x,y)\,dx + \int_{1}^{e} dy \int_{\ln y}^{1} f(x,y)\,dx$$

8. $$\iint_D y\,dx\,dy = \int_{\frac{\pi}{6}}^{\frac{\pi}{4}} d\varphi \int_0^{2\cos\varphi} r\sin(\varphi)\cdot r\,dr = \cdots = \frac{5}{24}$$