Rješenja Druge domaće zadaće iz Matematike 3E i 3R

1. $f(x) = \frac{2}{\pi}\int_0^\infty \frac{\sin\lambda(x-1)-\sin\lambda(x-3)}{\lambda}\,d\lambda$

2. $f(x) = \frac{1}{\pi}\int_0^\infty \frac{\cos\lambda(\pi-x)+\cos\lambda x}{1-\lambda^2}\,d\lambda$

3. $f(x) = \frac{2}{\pi}\int_0^\infty \frac{\sin\lambda-\lambda\cos\lambda}{\lambda^2}\sin\lambda x\,d\lambda$

4. $f(x) = \frac{2}{\pi}\int_0^\infty \frac{1-\cos\lambda}{\lambda^2}\cos\lambda x\,d\lambda$

5. $A(\lambda) = \frac{A}{\pi T}(\frac{T}{\lambda}\sin\lambda T + \frac{1}{\lambda^2}(\cos\lambda T - 1))$, $B(\lambda) = \frac{A}{\pi T}(-\frac{T}{\lambda}\cos\lambda T + \frac{1}{\lambda^2}\sin\lambda T)$

6. $f(x) = \frac{2a}{\pi}\int_0^\infty \frac{\cos\frac{\lambda\pi}{2a}}{a^2-\lambda^2}\cos\lambda x\,d\lambda$, $\int_0^\infty \frac{\cos\frac{\lambda\pi}{2a}}{a^2-\lambda^2}\,d\lambda = \frac{\pi}{2a}$

7. A. $F(s) = \frac{2}{s^2} + \frac{1}{s}$, $s > 0$ B. $F(s) = \frac{1}{(s+1)^2}$, $s > -1$ C. $F(s) = \frac{1}{s^2-2s+2}$, $s > 1$

8. A. $F(s) = \frac{1}{s}e^{-sT}$ B. $F(s) = \frac{1}{s}(1 - e^{-sT})$,

9. A. $F(s) = \frac{1}{s^2}(1 - e^{-s})$, B. $F(s) = \frac{1}{s}(e^{-s} - e^{-2s})$

10. A. DA, $a_0 = 3$, B. DA, $a_0 = 0$, C. DA, $a_0 = -2$, D. NE

11. A. $f(t) = (2ch(\sqrt{6}t) - \frac{3}{\sqrt{6}}\sin(\sqrt{6}t))u(t)$
B. $f(t) = (4\cos(\sqrt{5}t) + \frac{1}{\sqrt{5}}\sin(\sqrt{5}t)u(t)$ C. $f(t) = (e^t - 2e^{-2t})u(t)$

12. A. $f(t) = (2e^{2t} + 4t)u(t)$, B. $f(t) = (\frac{1}{2}t^2 - 2t)u(t)$
C. $f(t) = (\frac{1}{3}t^3 + \frac{1}{24}t^4 - t)u(t)$

13. A. $F(s) = (\frac{2}{s^3} + \frac{4}{s^2} + \frac{4}{s})e^{-2s}$ B. $F(s) = \frac{3}{2}(\frac{1}{s^2-36} - \frac{1}{s^2-4})$
C. $F(s) = \frac{2}{(s^2+1)^2}$ D. $F(s) = \frac{1}{s}(1 + e^{-3s})$

14. A. $F(s) = \frac{5}{s}e^{-2s} - \frac{2}{s}e^{-3s}$
B. $F(s) = \frac{6}{(s+2)^4} + \frac{2}{s^3}$
C. $F(s) = \frac{1}{s}(1 + e^{-s} - e^{-2s})$
D. $F(s) = \frac{2}{s(s-1)^3}$

15. A. $F(s) = \frac{1}{s} + (\frac{2}{(s+2)^3} + \frac{6}{(s+2)^2} + \frac{9}{s+2})e^{-3(s+2)}$ B. $F(s) = \frac{1}{2}\ln\frac{s+1}{s-1}$
C. $F(s) = \frac{6}{(s+1)^4} + \frac{1}{s+1}$ D. $F(s) = \frac{1}{s^2}e^{-2s} + \frac{1}{s}e^{-2s}$

16. $F(s) = \frac{-3}{s^2(1-e^{-4s})}(2se^{-4s} + e^{-2s} - 1)$

17. A. $\frac{\pi}{2} - arctga$, B. $\frac{3}{25}$, C. $\ln 2$

18. A. $f(t) = \mathrm{sh}t\, e^{-2t}u(t)$
B. $(\delta(t-2) + \frac{1}{5}e^{t-2} + \frac{4}{5}\cos 2(t-2) - \frac{8}{5}\sin 2(t-2))u(t-2)$
C. $e^{-(t-4)}(\cos 2(t-4) + \frac{1}{2}\sin 2(t-4))u(t-4)$

19. A. $f(t) = (-\frac{3}{4} - \frac{1}{2}t + \frac{2}{3}e^t + \frac{1}{12}e^{-2t})u(t)$ B. $f(t) = (2e^t + te^t - 2e^{2t} + te^{2t})u(t)$

20. A. $f(t) = -\frac{1}{3}(e^{-3t} - 1)u(t)$
B. $f(t) = \frac{1}{5}(1 - e^{2t}\cos t + 2e^{2t}\sin t)u(t)$
C. $f(t) = (t - 3 + \frac{1}{2}e^{-t}(t^2 + 4t + 6))u(t)$