4. Uvod u diferencijalne jednadžbe, 5. dio - Rješenja

1. $y(x) = e^{-x}(c_1 + c_2 x + c_3 x^2)$, $y(x) = e^{-x}(1 + 3x + 4x^2)$.
2. $y(x) = c_1 e^{3x} + \left(c_2 - \dfrac{x}{4}\right) e^{-3x} + c_3 \cos x + c_4 \sin x$.
3. $y(x) = c_1 + c_2 e^{2x} + \dfrac{1}{2} x e^{2x} - \dfrac{5}{2} x$.
4. $y(x) = c_1 e^{2x} + c_2 x e^{2x} + \dfrac{1}{8} \cos(2x) + \dfrac{1}{2} x^2 e^{2x}$.
5. $y(x) = A \sin x + B \cos x - x \cos x + \sin x \ln |\sin x|$.
6. $y(x) = e^x (A + Bx) + x e^x (\ln |x| - 1)$.
7. $y(x) = \dfrac{4}{15} x^{\frac{5}{2}} e^{-x} + B e^{-x} + A x e^{-x}$.
8. $y(x) = (A e^{-x} + Bx + C) - x + x \ln |x| + 1$.
9. $y(x) = \dfrac{\cos^2 x}{\sin x} - \dfrac{1}{2 \sin x} + A \sin x + B \cos x$.
10. $y(x) = e^{-2x} \left(\dfrac{1}{2} x^2 \ln x - \dfrac{3}{4} x^2 + Ax + B \right)$.
11. $y(x) = A e^{2x} + B e^x + e^x (2x^2 + x)$.
12. $x(t) = c_1 e^t + c_2 e^{-t} - 1, \quad y(t) = c_1 e^t - c_2 e^{-t} - 1$.
13. $y(x) = c_1 + c_2 e^{2x} - \dfrac{1}{4}(x^2 + x), \quad z(x) = c_2 e^{2x} - c_1 + \dfrac{1}{4}(x^2 - x - 1)$.
14. $x(t) = (1 - 2t) e^{-2t}, \quad y(t) = (1 + 2t) e^{-2t}$.
15. $x(t) = c_1 \cos(2t) + c_2 \sin(2t) + t, \quad y(t) = c_1 \sin(2t) - c_2 \cos(2t) + 1$.

16. $y(t) = -e^{-t} + \frac{1}{4}e^{-2t} + \frac{3}{4}e^{2t}, \quad z(t) = -\frac{2}{3}e^{t} - \frac{1}{12}e^{-2t} + \frac{3}{4}e^{2t}.$

17. $y(x) = c_1 + c_2 x + 2\sin x, \quad z(t) = -2c_1 - c_2(2x+1) - 3\sin x - 2\cos x.$

18. (a) x=insekti, y=ptice, (b) $x = 200$, $y = 25000$, (c)$\frac{dy}{dx} = \frac{-0.2y + 0.000008xy}{0.4x - 0.002xy}.$

19. (a) $L = 200$, $A = 5000$, (b) $\frac{dL}{dA} = \frac{-0.5L + 0.0001AL}{2A - 0.01AL}.$