

Gyakorló feladatok megoldásai - 4.

MA1222i

1. (a) $y = c_1 e^{-x} + c_2 e^{-2x}$
 (b) $y = e^x$
 (c) $y = c_1 e^x \cos x + c_2 e^x \sin x$
 (d) $y = \sqrt{2} e^{-(x-\pi/4)} \cos x + \sqrt{2} e^{-(x-\pi/4)} \sin x$
 (e) $y = c_1 e^{-x/3} + c_2 x e^{-x/3}$
 (f) $y = \frac{1}{2} \sin 2x$
 (g) $y = c_1 e^{2x} \cos 2x + c_2 e^{2x} \sin 2x$
 (g) $y = 7e^{-2(x+1)} + 5xe^{-2(x+1)}$

2. $\alpha = -2$

13. (a) $y = c_1 e^{-x} \cos 2x + c_2 e^{-x} \sin 2x + \frac{3}{17} \sin 2x - \frac{12}{17} \cos 2x$
 (c) $y = \left(\frac{3}{10} x^2 + \frac{7}{25} x + \frac{189}{250} \right) \cos x + \left(-\frac{1}{10} x^2 + \frac{24}{25} x - \frac{227}{250} \right) \sin x + \frac{1}{5} e^{2x} + c_1 e^{-x} + c_2 e^{-1/2x}$
 (e) $y = x + \frac{1}{4} x \sin x - \frac{1}{4} x^2 \cos x + c_1 \sin x + c_2 \cos x$
 (g) $y = c_1 e^x + c_2 x e^x - \frac{1}{2} e^x \ln(1 + x^2) + x e^x \arctg x$

14. (a) $y = c_1 x + c_2 x^{-2}$
 (b) $y = c_1 x + c_2 x e^x$
 (c) $y = c_1 e^x + c_2 x$
 (d) $y = c_1 x^{-1/2} \sin x + c_2 x^{-1/2} \cos x$

15. (a) $y = c_1 + c_2 x^{-1}$
 (b) $y = c_1 x^2 + c_2 x^2 \ln x$
 (c) $y = c_1 x^{-3} + c_2 x^{-4}$
 (d) $y = 2x^{3/2} - x^{-1}$
 (e) $y = 2x^{-1/2} \cos(2 \ln x) - x^{-1/2} \sin(2 \ln x)$

16. $\alpha < 1$

17. $\alpha > 0$

18. (a) $y = c_1 x^{-1} + c_2 + \ln x$

(c) $c_1^2 y = c_1 x - \ln |1 + c_1 x| + c_2$, ha $c_1 \neq 0$; $y = \frac{1}{2}x^2 + c_2$, ha $c_1 = 0$; $y = c$

(e) $\frac{1}{3}y^3 - 2c_1 y + c_2 = 2x$; $y = c$

19. (a) $y = c_1 e^x + c_2 x e^x + c_3 e^{-x}$

(b) $y = c_1 + c_2 x + c_3 e^x + c_4 e^{-x} + c_5 \cos x + c_6 \sin x$

(c) $y = c_1 + c_2 x + c_3 e^{2x} + c_4 x e^{2x}$

(d) $y = c_1 \cos x + c_2 \sin x + e^{\sqrt{3}x/2} (c_3 \cos \frac{1}{2}x + c_4 \sin \frac{1}{2}x) + e^{-\sqrt{3}x/2} (c_5 \cos \frac{1}{2}x + c_6 \sin \frac{1}{2}x)$

(e) $y = \cos x$