Diferenciální rovnice 1. řádu

1. $\frac{x}{\sqrt{1+x^2}} + \frac{y}{\sqrt{1+y^2}} \, y' = 0$

2. $(x+1) \, y' = 1 - y \; ; \; y(0) = 5$

3. $y \, (y^2 - 1) - (x^2 - 1) \, y' = 0$

4. $y^2 + (x^2 - xy) \, y' = 0$

5. $x \, y' + y = y^2 \, \ln x$

6. $x \, y' - y = x^2 \, y^{-1}$

7. $y' = \frac{2x - y + 1}{x - 2y + 1}$

8. $y' = -\frac{x - 2y + 5}{2x - y + 4}$

9. $y' = 2 \left(\frac{y+2}{x+y-1} \right)^2$

10. $y' = (x + y)^2$

11. $y' = \frac{1}{x+2y}$

12. $y' + \frac{2x}{1+x^2} \, y = \frac{2x^2}{1+x^2}$

13. $y' + (y - 1) \, \mathrm{tg} \; x = 0$

14. $y' + \frac{y}{x} = x$

15. $y' + y \, \cos x = \cos x$

16. $x \, y' - \frac{y}{x+1} = x \; ; \; y(1) = 2$

17. $(x+1) \, y' - 2y = (x+1)^4$

18. $y' + \frac{y}{1+x} = -y^2$

19. $y' + 2xy = 2x^3 y^3$

20. $y' - y + y^2 \cos x = 0$

21. $x^2 \sqrt{1 + y^2} + y^2 \sqrt{1 + x^2}\, y' = 0$

22. $1 - y^2 - 2xy\, y' = 0$

23. $y^2 - y' + 1 = 0$

24. $x^2 + 1 + y' \cos y = 0$

25. $e^x + 2x + y' \sin y = 0$

26. $(2x + 1)\, y' + y^2 = 0 \; ; \; y(4) = 1$

27. $x - y + x\, y' = 0$

28. $y^2 - xy + (x^2 + xy)\, y' = 0$

29. $(y^2 - xy)\, y' + x^2 + y^2 = 0$

30. $xy + (y^2 - xy + x^2)\, y' = 0$

31. $x^3\, y' = y^3$

32. $y' = e^{\frac{y}{x}} + \frac{y}{x}$

33. $(x - y)\, y' = x + y$

34. $y' = \frac{3x - 4y}{4x + 7y - 1}$

35. $(y - x - 4)\, y' = x + y - 2$

36. $(x + y)^2\, y' = 4$

37. $y' + 2y = x$

38. $y' - \frac{y}{x} = \left(\frac{y}{x}\right)^2$

39. $(y - 2x - 4)\, y' = x + 2y - 2$

40. $y^2 - 2\,xy + (2\,x^2 + 3\,xy)\, y' = 0; \; y(1) = 1$

41. $y' - \frac{4}{x+1}y = 2(x+1)^3\sqrt{y}$

42. $xy' + (x^2y+1)y = 0;\ y(2) = -\frac{1}{2}$

43. $(x+2)y' - y = xy^3;\ y(0) = \frac{1}{2}$

44. $y' = \frac{x+2y+3}{2x+5y+6};\ y(1) = 0$

45. $y' = 2\left(\frac{y+4}{x+y-5}\right)^2$

46. $y' = -\frac{4x+3y+1}{3x+2y+1}$

47. $y'x - y = \frac{x(y+x)(y+2x)^2}{y+3x}$

48. $(x+1)y' - 3y = (x+2)^2\sqrt[3]{y};\quad y(0) = 1$

49. $y' + xy = x^3y^3$

Diferenciální rovnice 1. řádu
Výsledky

1. $\sqrt{1+x^2} + \sqrt{1+y^2} = c,\ c \in \mathbb{R}$

2. $y = \frac{5+x}{1+x}\ ;\ x > -1,\ c \in \mathbb{R}$

3. $\left|\frac{x-1}{x+1}\right|\ \frac{y^2}{|y^2-1|} = c,\ c > 0$

4. $y = c\,\mathrm{e}^{\frac{y}{x}},\ c \in \mathbb{R}$

5. $y = -\ln(x\,\mathrm{e}^{\,c\,x+1}),\ c \in \mathbb{R},\ y \equiv 0$

6. $y^2 = x^2\,(\ln x^2 + c),\ c > 0$

7. $x^2 - xy + y^2 + x - y + c = 0,\ c < \frac{1}{3}$

8. $y - x - 3 = c\,(x+y-1)^3,\ c \in \mathbb{R}$

9. $(y+2)\mathrm{e}^{\,2\,\mathrm{arctg}\,\frac{y+2}{x-3}} = c,\ c \in \mathbb{R}$

10. $y = \mathrm{tg}\,(x+c) - x,\ c \in \mathbb{R}$

11. $(x + 2\,y + 2)^2 = \mathrm{e}^{\,2\,y+c},\ c \in \mathbb{R}$

12. $y = \frac{c}{1+x^2} + \frac{2}{3}\frac{x^3}{1+x^2},\ c \in \mathbb{R}$

13. $y = c\,\cos x + 1,\ c \in \mathbb{R}$

14. $y = \frac{c}{x} + \frac{1}{3}\,x^2,\ c \in \mathbb{R}$

15. $y = c\,\mathrm{e}^{\,-\sin x} + 1,\ c \in \mathbb{R}$

16. $y = 3\frac{x}{x+1} + (x + \ln x)\frac{x}{x+1}$

17. $y = \left(\frac{x^2}{2} + x + c\right)(x+1)^2,\ c \in \mathbb{R}$

18. $y = \frac{1}{(1+x)\,(c+\ln(1+x))},\ c \neq 0,\ y \equiv 0$

19. $y = \pm\frac{1}{\sqrt{c\,\mathrm{e}^{\,2x^2} + x^2 + \frac{1}{2}}},\ c > 0,\ y \equiv 0$

20. $y = \dfrac{2}{2\,c\,\mathrm{e}^{-x} + \sin x + \cos x}$, $c \neq 0$, $y \equiv 0$

21. $\dfrac{1}{2}\,x\,\sqrt{1+x^2} - \dfrac{1}{2}\,\mathrm{argsinh}\,x + \dfrac{1}{2}\,y\,\sqrt{1+y^2} - \dfrac{1}{2}\,\mathrm{argsinh}\,y = c$, $c \in \mathbb{R}$

22. $y = \pm\sqrt{1 + \dfrac{c}{x}}$, $c \in \mathbb{R}$

23. $y = \mathrm{tg}\,(x+c)$, $c \in \mathbb{R}$

24. $y = -\arcsin\left(\dfrac{x^3}{3} + x + c\right)$, $c \in \mathbb{R}$

25. $y = \arccos(\mathrm{e}^x + x^2 + c)$, $c \in \mathbb{R}$

26. $y = \dfrac{2}{\ln(2x+1) + 2 - \ln 9}$

27. $y = x\,(c - lnx)$, $c \in \mathbb{R}$, $y \equiv 0$

28. $y\,\mathrm{e}^{-\frac{x}{y}} = \dfrac{c}{x}$, $c \in \mathbb{R}$

29. $\dfrac{2}{3}\,\ln\left|\dfrac{y}{x} + 1\right| + \dfrac{1}{6}\,\ln\left(\dfrac{y^2}{x^2} - \dfrac{y}{x} + 1\right) - \dfrac{1}{\sqrt{3}}\mathrm{arctg}\left(\dfrac{1}{\sqrt{3}}\left(2\dfrac{y}{x} - 1\right)\right) + \ln|x| + c = 0$, $c \in \mathbb{R}$

30. $-\dfrac{1}{2}\,\ln\left|\dfrac{y}{x}\right| - \dfrac{1}{4}\,\ln\left(\dfrac{y^2}{x^2} - \dfrac{y}{x} + 2\right) + \dfrac{1}{2\sqrt{7}}\,\mathrm{arctg}\left(\dfrac{1}{\sqrt{7}}\left(2\dfrac{y}{x} - 1\right)\right) - \ln|x| + c = 0$, $c \in \mathbb{R}$

31. $y = \pm\dfrac{x}{\sqrt{1 + c\,x^2}}$, $c \in \mathbb{R}$, $y \equiv 0$

32. $y = x\,\ln\left(-\dfrac{1}{\ln|x| + c}\right)$, $c \in \mathbb{R}$

33. $-\dfrac{1}{2}\ln\left(1 + \dfrac{y^2}{x^2}\right) + \mathrm{arctg}\,\dfrac{y}{x} - \ln|x| = c$, $c \in \mathbb{R}$

34. $7y^2 - 3x^2 + 8x\,y - 2y + 3 + c = 0$, $c \in \mathbb{R}$

35. $y^2 - x^2 - 8y + 4x - 2x\,y + 14 + c = 0$, $c \in \mathbb{R}$

36. $-y + 2\,\mathrm{arctg}\,\dfrac{x+y}{2} + c = 0$, $c \in \mathbb{R}$

37. $y = \dfrac{c}{\mathrm{e}^{2x}} + \dfrac{1}{4}(2x - 1)$, $c \in \mathbb{R}$

38. $y = -\dfrac{x}{\ln|x| + c}$ $c \in \mathbb{R}$, $y \equiv 0$

39. ???

40. ???

41. ???

42. ???

43. ???

44. ???

45. ???

46. ???

47. ???

48. ???

49. ???

50. ???