Differenciálegyenletek (geológusoknak) választható feladatok

2015/16. őszi félév

A feladat minden esetben, hogy oldjuk meg a differenciálegyenletet.

1. $$y'(x) = \frac{1}{x+1},$$

2. $$y'(x) = \frac{x^2 y(x)}{1+x^3},$$

3. $$y'(x) = \frac{1}{y^2(x)},$$

4. $$y'(x) = \frac{1}{4y^3(x) + \sin(y(x))},$$

5. $$y'(x) = \frac{-e^{x-y}}{e^{y-x}},$$

6. $$y'(x) = \frac{1}{y(x)(9+4x^2)},$$

7. $$y'(x) = \frac{2x^4}{x^5+3} y(x),$$

8. $$y'(x) = \frac{4y(x)}{x(y(x)-3)},$$

9. $$2x(2y^2(x)-1)y'(x) = y^3(x)(x+3),$$

10. $$y'(x) = \frac{y(x)}{x} + \sqrt{1 + \left(\frac{y(x)}{x}\right)^2},$$

11. $$(y(x)+x)y'(x) = -(2x+y(x)),$$

12.
$$3xy^2(x)y'(x) + x^3 + y^3(x) = 0,$$

13.
$$y'(x) + \operatorname{tg}(x)y(x) = \frac{1}{\cos(x)},$$

14.
$$y'(x) - 5y(x) = 2xe^{5x},$$

15.
$$y'(x) - \frac{1}{x}y(x) = x^2 + \frac{1}{x},$$

16.
$$y'(x) - 4y(x) = 12x^3 - 3x + 1,$$

17.
$$y'(x) + \frac{2}{x}y(x) = x^3,$$

18.
$$y'(x) + y(x) = e^{-x},$$

19.
$$y'(x) - xy(x) = x^3,$$

20.
$$(x^2 - y(x))\,\mathrm{d}x - x\,\mathrm{d}y = 0,$$

21.
$$(2x^3 + 3y(x))\,\mathrm{d}x + (3x + y(x) - 1)\,\mathrm{d}y = 0,$$

22.
$$\left(y^2(x)e^{xy^2(x)} + 4x^3\right)\mathrm{d}x + \left(2xy(x)e^{xy^2(x)} - 3y^2(x)\right)\mathrm{d}y = 0,$$

23.
$$y'(x) - y(x) = xy^5(x),$$

24.
$$3y'(x) + y(x) = (1 - 2x)y^4(x),$$

25.
$$y'(x) + y(x) = y^2(x)(\cos(x) - \sin(x)),$$

26.
$$xy''(x) - y'(x) = x^3,$$

27.
$$y''(x) + 5y'(x) + 4y(x) = -x^2 - 2x + 3,$$

28.

$$y''(x) - 6y'(x) + 13y(x) = \sin(3x) + x,$$

29.

$$y''(x) - 6y'(x) + 13y(x) = 39,$$

30.

$$y''(x) - y'(x) - 2y(x) = e^x,$$

31.

$$y''(x) - 2y'(x) - 3y(x) = 2x + 1.$$

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