

Задание 3.

А) Решить уравнение с разделяющимися переменными.

1.1. $xydx + (x + 1)dy = 0$.

1.2. $xy' + y = y^2$.

1.3. $xdx + tdt = dt$.

1.4. $(xy^2 + x)dx + (y - x^2y)dy = 0$.

1.5. $y'xy - 1 + x^2 = 0$.

1.6. $y' + x^2y - x^2 = 0$.

1.7. $x\sqrt{1 + y^2}dx + y\sqrt{1 + x^2}dy = 0$.

1.8. $x^2dy - (2xy + 3y)dx = 0$.

1.9. $1 + y^2 - \sqrt{x}y' = 0$.

1.10. $y^2y' - 1 - 2x = 0$.

1.11. $(1 - y^2)dx = (y + x^2y)dy$.

1.12. $y' \cos^2 x - \sin^2 x = 0$.

1.13. $y' - 3^{x+y} = 0$.

1.14. $\operatorname{tg} xdy - (1 + y)dx = 0$.

1.15. $y' \sin x - y \ln y = 0$.

1.16. $(1 + y^2)y' - y = 0$.

1.17. $y' \cos x \ln y - y = 0$.

1.18. $y'(1 - x^2) = xy + xy^2$.

1.19. $xydx + (1 + x + y + xy)dy = 0$.

1.20. $y + xy' + (1 + y')xy = 0$.

1.21. $y'y + x - \frac{1}{x} = 0$.

1.22. $(1 + e^x)yy' - e^x = 0$.

1.23. $xy' - e^y - 2y' = 0$.

1.24. $x^2y^2y' - y - 1 = 0$.

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

1.26. $(4x + 2xy^2)dx = (3y + 3x^2y)dy$.

1.27. $\sqrt{4 + y^2}dx - ydy = x^2ydy$.

1.28. $x\sqrt{3 + y^2}dx + y\sqrt{2 + x^2}dy = 0$.

1.29. $(e^{2x} + 5)dy + ye^{2x}dx = 0$.

1.30. $y' = \frac{ye^x}{e^x + 8}$.

1.31. $x^2dy - (2xy + 3y)dx = 0$

1.32. $xy' - e^y - 2y' = 0$

Б) Решить линейное дифференциальное уравнение.

3.1. $xy' - 2y = 2x^4$.

3.2. $x^2y' + xy + 1 = 0$.

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

3.4. $(2x + 1)y' = 4x + 2y$.

3.5. $x(y' - y) = e^x$.

3.6. $2xy' + y = x$.

3.7. $y' + 2y = x^2 + x$.

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

3.9. $e^x(y + y') = 1$.

3.10. $x^2y' + 2xy = \ln x$.

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

3.12. $xy' - y = 3x^2$.

3.13. $y' + xy = x$.

3.14. $y' - y \operatorname{ctg} x = \sin x$.

3.15. $(1 - x)(y' + y) = e^{-x}$.

3.16. $xy' + y = e^x$.

3.17. $y' - y \operatorname{tg} x = \frac{1}{\cos x}$.

3.18. $xy' - y = x^2 \cos x$.

3.19. $y' + 2xy = xe^{-x^2}$.

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

3.21. $x^2y' + 2xy = 1$.

3.22. $(1 - x^2)y' + xy = x$.

3.23. $xy' - 2y = x + 1$.

3.24. $xy' + y = \sin x$.

3.25. $(x^2 + 1)y' + 4xy = 3$.

3.26. $y' + y \cos x = \frac{1}{2} \sin 2x$.

3.27. $y' - 4xy + 4x^3 = 0$.

3.28. $x^2y' - xy = -2$.

3.29. $xy' - y + \ln x = 0$.

3.30. $y' + xy + x^3 = 0$.

В) Решить уравнение

1. $y'' + 2y' + y = 0$.

2. $y'' - 6y' + 9y = 0$.

3. $y'' - 8y' + 16y = 0$.

4. $4y'' - 12y' + 9y = 0$.

5. $y'' - y' + 9y = 0$.

6. $y'' + 6y' + 9y = 0$.

7. $4y'' - 12y' + 9y = 0$.

8. $16y'' - 8y' + y = 0$.

9. $2y'' - 3y' + 6y = 0$.

10. $9y'' - 6y' + y = 0$.

11. $3y'' + y' - 6y = 0$.

12. $4y'' - 4y' + y = 0$.

13. $y'' + 3y' + 5y = 0$.

14. $9y'' + 6y' - y = 0$.

15. $y'' - 4y' + 8y = 0$.

16. $y'' - 5y' + 6y = 0$.

17. $25y'' - 10y' + y = 0$.

18. $y'' - 3y' + 2y = 0$.

19. $16y'' + 8y' + y = 0$.

20. $y'' + 3y' + 2y = 0$.

21. $9y'' - 24y' + 16y = 0$.

22. $2y'' + 5y' + 16y = 0$.

23. $25y'' - 20y' + 4y = 0$.

24. $y'' - 7y' + 6y = 0$.

25. $3y'' - 7y' - 10y = 0$.

26. $y'' + 4y' + y = 0$.

27. $y'' - 6y' + 9y = 0$.

28. $y'' - 3y' + 8y = 0$.

29. $y'' - 3y' + 2y = 0$.

30. $3y'' - y' + 11y = 0$.

31. $5y'' - 4y' + 3y = 0$

32. $17y'' - 4y' + y = 0$