

Задачи по математическому анализу для экзамена в магистратуру
по специальности 010502

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

2. $y'' + 6y' + 10y = 3xe^{-3x} - 2e^{-3x} \cos x.$

3. $y'' - 8y' + 20y = 5xe^{4x} \sin 2x.$

4. $y'' + 7y' + 10y = xe^{-2x} + \cos 5x.$

5. $y'' - 2y' + 5y = 2xe^x + e^x \sin 2x.$

6. $y'' - 2y' + y = 2xe^x + e^x \sin 2x.$

7. $y'' - 8y' + 17y = e^{4x}(x^2 - 3x \sin x).$

8. $y'' - 6y' + 8y = 5xe^{2x} + 2e^{4x} \sin x.$

9. $y'' - 2y' + 2y = (x + e^x) \sin x.$

10. $y' + 2y = y^2 e^x.$

11. $y' = y^4 \cos x + y \operatorname{tg} x.$

$$12. \ xy^2y' = x^2 + y^3.$$

$$13. \ xy' - 2x^2\sqrt{y} = 4y.$$

$$14. \ xy' + 2y + x^5y^3e^x = 0.$$

$$15. \ \int \frac{dx}{\sin^6 x}.$$

$$16. \ \int \frac{\sin^2 x}{\cos^6 x} dx.$$

$$17. \ \int \frac{dx}{\cos^6 x}.$$

$$18. \ \int \frac{\cos^2 x}{\sin^6 x} dx.$$

$$19. \ \int \frac{dx}{\sin^3 x \cos^5 x} dx.$$

$$20. \ \int \frac{dx}{\cos^3 x \sin^5 x} dx.$$

$$21. \ \int \frac{3x^2 + 2x - 1}{(x - 1)^2(x + 2)} dx.$$

$$22. \ \int \frac{2x - 5}{(x - 1)(x^2 + x + 1)^2} dx.$$

$$23. \ \int \frac{dx}{x(x^2 + 2)}.$$

$$24. \int \frac{x^2 - x + 4}{(x+1)(x-2)(x-3)} dx.$$

$$25. \int \frac{dx}{x^3 + 8}.$$

$$26. \int \frac{5x - 13}{(x^2 - 5x + 6)^2} dx.$$

$$27. \int \frac{dx}{x^4 + 2x + 1}.$$

$$28. \int \frac{x^4 + 1}{x^4 - 1} dx.$$