

Өздік жұмыстар

1. Жіктеу әдісін қолданып интегралды табу керек.

$$1.1. \int x^2(2-3x^2)^2 dx$$

$$1.2. \int \frac{x^3}{3+x} dx$$

$$1.3. \int \frac{x^2}{(1-x)^{100}} dx$$

$$1.4. \int x\sqrt{2-5x} dx$$

$$1.5. \int \frac{dx}{(x-1)(x+3)}$$

$$1.6. \int \frac{dx}{(x^2-2)(x^2+3)}$$

$$1.7. \int \frac{dx}{(x+a)^2(x+b)^2}$$

$$1.8. \int \cos^2 x dx$$

$$1.9. \int \sin^3 x dx$$

$$1.10. \int \cos^3 x dx$$

$$1.11. \int \operatorname{ctg}^2 x dx$$

$$1.12. \int \frac{dx}{\sin^2 x \cdot \cos^2 x}$$

$$1.13. \int \frac{\cos^3 x}{\sin x} dx$$

$$1.14. \int \frac{(1+e^x)^2}{1+e^{2x}} dx$$

$$1.15. \int \frac{1+x}{1-x} dx$$

$$1.16. \int \frac{(1+x)^2}{1+x^2} dx$$

$$1.17. \int \frac{x^5}{x+1} dx$$

$$1.18. \int \frac{xdx}{\sqrt[3]{1-3x}}$$

$$1.19. \int \frac{dx}{x^2+x-2}$$

$$1.20. \int \frac{xdx}{(x+2)(x+3)}$$

$$1.21. \int \frac{dx}{(x^2+a^2)(x^2+b^2)} \quad (a^2 \neq b^2)$$

$$1.22. \int \sin x \sin(x+\alpha) dx$$

$$1.23. \int \sin\left(2x - \frac{\pi}{6}\right) \cos\left(3x + \frac{\pi}{6}\right) dx$$

$$1.24. \int \sin^4 x dx$$

$$1.25. \int \operatorname{tg}^3 x dx$$

2. Дифференциал астына енгізу әдісін қолданып интегралды табу керек.

$$2.1. \int \sin \frac{1}{x} \cdot \frac{dx}{x^2}$$

$$2.2. \int \frac{dx}{x\sqrt{x^2-1}}$$

$$2.3. \int \frac{xdx}{(x^2-1)^{3/2}}$$

$$2.4. \int \frac{dx}{\sqrt{x(1-x)}}$$

2.5. $\int x e^{-x^2} dx$

2.6. $\int \frac{e^x dx}{3 + e^x}$

2.7. $\int \frac{dx}{e^x + e^{-x}}$

2.8. $\int \frac{dx}{\sqrt{1 + e^{2x}}}$

2.9. $\int \frac{\sin x}{\sqrt{\cos^3 x}} dx$

2.10. $\int \operatorname{ctg} x dx$

2.11. $\int \frac{\sin x + \cos x}{\sqrt[3]{\sin x - \cos x}} dx$

2.12. $\int \frac{\sin x \cos x}{\sqrt{a^2 \sin^2 x + b^2 \cos^2 x}} dx$

2.13. $\int \frac{\cos x}{\sqrt{\cos 2x}} dx$

2.14. $\int \frac{dx}{\sin^2 x + 2 \cos^2 x}$

2.15. $\int \frac{dx}{\sin x}$

2.16. $\int \frac{dx}{(\arcsin x)^2 \sqrt{1 - x^2}}$

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

2.18. $\int \frac{x^{n/2} dx}{\sqrt{1 + x^{n+2}}}$

2.19. $\int \frac{2^x \cdot 3^x}{9^x - 4^x} dx$

2.20. $\int \frac{x^2 dx}{\sqrt{x^6 - 1}}$

2.21. $\int \sin^3 6x \cos 6x dx$

2.22. $\int \frac{\sin(\ln x)}{x} dx$

2.23. $\int e^{x^2 + 4x + 3} (x + 2) dx$

2.24. $\int \frac{e^x \sqrt{\operatorname{arctg} e^x}}{1 + e^{2x}} dx$

2.25. $\int \frac{dx}{\operatorname{tg} x \ln^2 \sin x}$

3. Айнымалыны ауыстыру әдісін қолданып интегралды табу керек.

3.1. $\int \frac{x dx}{(3x + 2)^7}$

3.2. $\int x^2 \sqrt[3]{1 - x} dx$

3.3. $\int x^3 (1 - 5x^2)^{10} dx$

3.4. $\int x^5 (2 - 5x^3)^{2/3} dx$

3.5. $\int \cos^5 x \sqrt{\sin x} dx$

3.6. $\int \sqrt{\frac{a+x}{a-x}} dx$

3.7. $\int \frac{dx}{(x^2 + a^2)^{3/2}}$

3.8. $\int x \sqrt{\frac{x}{2a-x}} dx$

3.9. $\int \sqrt{(x-a)(b-x)} dx$

3.10. $\int \frac{dx}{e^{\frac{x}{2}} + e^x}$

3.11. $\int \sqrt{1+x^2} dx$

3.12. $\int \frac{x^2}{\sqrt{a^2+x^2}} dx$

3.13. $\int \frac{dx}{\sqrt{(x-a)(b-x)}}$

3.14. $\int \frac{x^3}{(x-1)^{100}} dx$

3.15. $\int x \cdot \sqrt[5]{3x+4} dx$

3.16. $\int \frac{\sin 2x}{\sqrt{3-\cos^4 x}} dx$

3.17. $\int \frac{dx}{x\sqrt{2x+1}}$

3.18. $\int \frac{dx}{e^x + 1}$

4. Бөліктеп интегралдау арқылы интегралды табу керек.

4.1. $\int \frac{\arcsin x}{x^2} dx$

4.2. $\int x^2 \arccos x dx$

4.3. $\int \ln(x + \sqrt{1+x^2}) dx$

4.4. $\int \sin x \cdot \ln(\operatorname{tg} x) dx$

4.5. $\int x^5 e^{x^3} dx$

4.6. $\int (\arcsin x)^2 dx$

4.7. $\int x(\operatorname{arctg} x)^2 dx$

4.8. $\int x^2 \ln \frac{1+x}{1-x} dx$

4.9. $\int x \cdot \operatorname{sh} x dx$

4.10. $\int \sqrt{a^2 - x^2} dx$

4.11. $\int \operatorname{arctg} \sqrt{x} dx$

4.12. $\int \sqrt{x} \ln^2 x dx$

4.13. $\int e^{ax} \cos b x dx$

4.14. $\int \frac{x e^x}{(x+1)^2} dx$

4.15. $\int e^{2x} \sin^2 x dx$

4.16. $\int x^3 e^{-x^2} dx$

4.17. $\int x^2 \sin b x dx$

4.18. $\int x e^{ax} dx$

4.19. $\int (x^2 + px + q) \cos b x dx$

4.20. $\int x^2 \log_a x dx$

4.21. $\int \sqrt{x^2 + A} dx$

4.22. $\int \arcsin \frac{x}{a} dx$

4.23. $\int \frac{x}{\sin^2 x} dx$

4.24. $\int e^{ax} (a \cos bx - b \sin bx) dx$

$$4.25. \int \frac{\arcsin \sqrt{x}}{\sqrt{x}} dx$$

5. Остроградский және белгісіз коэффициенттерді анықтау әдісін қолданып интегралды табу керек.

$$5.1. \int \frac{xdx}{(x-1)^2(x+1)^3}$$

$$5.2. \int \frac{x^2+3x-2}{(x-1)(x^2+x+1)^2} dx$$

$$5.3. \int \frac{dx}{(x^4-1)^3}$$

$$5.4. \int \frac{x^2 dx}{(x^2+2x+2)^2}$$

$$5.5. \int \frac{dx}{(x^2+1)^3}$$

$$5.6. \int \frac{dx}{(x^3+1)^2}$$

$$5.7. \int \frac{dx}{(x^4-1)^3}$$

$$5.8. \int \frac{7x-2}{3x^2-5x+4} dx$$

$$5.9. \int \frac{x-2}{x^2-1} dx$$

$$5.10. \int \frac{6x^5-8x^4-25x^3+20x^2-76x-7}{3x^3-4x^2-17x+6} dx$$

$$5.11. \int \frac{3x^4+14x^2+7x+15}{(x+3)(x^2+2)^2} dx$$

$$5.12. \int \frac{xdx}{(x+1)(x+3)(x+5)}$$

$$5.13. \int \frac{(x^2+2x+6)dx}{(x-1)(x-2)(x-4)}$$

$$5.14. \int \frac{dx}{(x-1)^2(x-2)}$$

$$5.15. \int \frac{5x^2+6x+9}{(x-3)^2(x+1)^2} dx$$

$$5.16. \int \frac{x+1}{(x^2+1)(x^2+9)} dx$$

$$5.17. \int \frac{dx}{x^3+1}$$

$$5.18. \int \frac{x^3+x-1}{(x^2+2)^2} dx$$

$$5.19. \int \frac{x^3+x+1}{x^4-81} dx$$

$$5.20. \int \frac{2x^2-3x-3}{(x-1)(x^2-2x+5)} dx$$

$$5.21. \int \frac{x^3-1}{4x^3-x} dx$$

$$5.22. \int \frac{(x^2+2x+6)dx}{(x-1)(x-2)(x-4)}$$

$$5.23. \int \frac{x^2-5x+9}{x^2-5x+6} dx$$

$$5.24. \int \frac{(3x+2)dx}{x(x+1)^2}$$

$$5.25. \int \frac{x^2}{(x+2)^2(x+4)^2} dx$$

6. Иррационал функцияларды интегралдау және Эйлер әдісін қолданып интегралды табу керек.

$$6.1. \int \frac{1}{(1-x)^2} \sqrt{\frac{1-x}{1+x}} dx$$

$$6.2. \int \frac{dx}{\sqrt{2x-1} - \sqrt[4]{2x-1}}$$

$$6.3. \int \frac{\sqrt{x}}{x+2} dx$$

$$6.4. \int \frac{dx}{(2-x)\sqrt{1-x}}$$

$$6.5. \int \frac{dx}{\sqrt{x+1} + \sqrt{(x+1)^3}}$$

$$6.6. \int \frac{dx}{\sqrt{x} + \sqrt[4]{x}}$$

$$6.7. \int \frac{\sqrt[3]{x} dx}{\sqrt[3]{x^2} - \sqrt{x}}$$

$$6.8. \int \frac{x + \sqrt{1+x}}{\sqrt[3]{1+x}}$$

$$6.9. \int \sqrt{\frac{1-x}{1+x}} \cdot \frac{dx}{x}$$

$$6.10. \int \frac{\sqrt[3]{3x+4}}{1 + \sqrt[3]{3x+4}} dx$$

$$6.11. \int \frac{dx}{x^2 \sqrt{x^2 + x + 1}}$$

$$6.12. \int \sqrt[3]{\frac{1-x}{1+x}} \cdot \frac{dx}{(1+x)^2}$$

$$6.13. \int \frac{dx}{x \cdot \sqrt{x^2 + x + 1}}$$

$$6.15. \int \frac{x^2 dx}{\sqrt{(x^2 + 1)^5}}$$

$$6.16. \int \frac{\sqrt{x^2 + 5}}{x^2} dx$$

$$6.17. \int \frac{\sqrt{x^2 - 1}}{x^2} dx$$

$$6.18. \int \frac{dx}{x \cdot \sqrt{x^2 + 4x - 4}}$$

$$6.19. \int \frac{dx}{1 + \sqrt{x}}$$

$$6.20. \int \frac{dx}{x(1 + 2\sqrt{x} + \sqrt[3]{x})}$$

$$6.21. \int \frac{x\sqrt[3]{2+x}}{x + \sqrt[3]{2+x}} dx$$

$$6.22. \int \frac{dx}{(1 + \sqrt[4]{x})^3 \sqrt{x}}$$

$$6.23. \int \frac{\sqrt{x+1} - \sqrt{x-1}}{\sqrt{x+1} + \sqrt{x-1}} dx$$

$$6.24. \int \frac{x^2 dx}{\sqrt{1+x+x^2}}$$

$$6.25. \int \frac{dx}{\sqrt[3]{(x+1)^2(x-1)^4}}$$

$$6.14. \int \frac{x dx}{\sqrt[4]{x^3(a-x)}} \quad a > 0$$

7. Тригонометриялық функцияларды интегралдау.

$$7.1. \int \frac{dx}{1 + \sin x + \cos x}$$

$$7.2. \int \frac{\cos x}{1 + \cos x} dx$$

$$7.3. \int \frac{\sin x}{1 - \sin x} dx$$

$$7.5. \int \frac{2 - \sin x}{2 + \cos x} dx$$

$$7.7. \int \frac{dx}{\sin^2 x \cdot \cos^4 x}$$

$$7.9. \int \operatorname{tg}^2 5x dx$$

$$7.11. \int \frac{dx}{3 \sin^2 x \cdot \cos x}$$

$$7.13. \int \cos^5 x dx$$

$$7.15. \int \sin 5x \cdot \cos x dx$$

$$7.17. \int \frac{dx}{(2 + \cos x) \sin x}$$

$$7.19. \int \frac{\sin x dx}{\sin^3 x + \cos^3 x}$$

$$7.21. \int \frac{\sin^2 x}{\sin x + 2 \cos x} dx$$

$$7.23. \int \frac{dx}{3 + 5 \operatorname{tg} x}$$

$$7.25. \int \frac{\sin x \cos x}{1 + \sin^4 x} dx$$

$$7.4. \int \frac{\sin x + \cos x}{3 + \sin 2x} dx +$$

$$7.6. \int \frac{dx}{1 + 3 \cos^2 x}$$

$$7.8. \int \frac{dx}{4 \sin^2 x + 9 \cos^2 x}$$

$$7.10. \int \frac{dx}{5 \sin^2 x - 3 \cos^2 x + 4}$$

$$7.12. \int \frac{dx}{2 \cos^2 x - \sin^2 x}$$

$$7.14. \int \frac{dx}{\sin^3 x}$$

$$7.16. \int \sin^3 2x \cdot \cos^2 3x dx$$

$$7.18. \int \frac{dx}{\sin^4 x + \cos^4 x}$$

$$7.20. \int \frac{\sin x \cos x}{\sin x + \cos x} dx$$

$$7.22. \int \frac{\sin^2 x \cos^2 x}{\sin^8 x + \cos^8 x} dx$$

$$7.24. \int \frac{dx}{(\sin^2 x + 2 \cos^2 x)^2}$$

