Знайти невизначені інтеграли.

1.1. $\int \frac{3+\sqrt[3]{x^2}-2x}{\sqrt{x}}\,dx.$ 1.2. $\int \frac{2x^2+3\sqrt{x}-1}{2x}\,dx.$ 1.3. $\int \frac{3\sqrt{x}+4x^2-5}{2x^2}\,dx.$

1.4. $\int \frac{2\sqrt{x}-x^2+3}{\sqrt[3]{x}}\,dx.$ 1.5. $\int \frac{\sqrt[4]{x}-2x+5}{x^2}\,dx.$ 1.6. $\int \frac{2x^3-\sqrt{x}+4}{\sqrt{x}}\,dx.$

1.7. $\int \left(\sqrt[3]{x}-\frac{2\sqrt[4]{x}}{x}+x\right)\,dx.$ 1.8. $\int \frac{2x^3-\sqrt{x^5}+1}{\sqrt{x}}\,dx.$ 1.9. $\int \frac{3x^2-\sqrt[5]{x}+2}{x^2}\,dx.$

1.10. $\int \frac{2x^3-\sqrt{x}+4}{x^2}\,dx.$ 1.11. $\int \frac{\sqrt[6]{x^5}-5x^2+3}{x}\,dx.$ 1.12. $\int \left(x\sqrt{x}-\frac{1}{\sqrt{x^3}}+1\right)\,dx.$

1.14. $\int \frac{\sqrt[3]{x^2}-2x^5+3}{x}\,dx.$ 1.13. $\int \left(x^2-\frac{\sqrt[6]{x}}{x}-3\right)\,dx.$ 1.15. $\int \left(\frac{\sqrt[3]{x}}{x}+2x^3-4\right)\,dx.$

1.16. $\int \frac{\sqrt[3]{x}-3x^4+2}{x}\,dx.$ 1.17. $\int \left(2x^3-3\sqrt{x^5}+\frac{4}{x}\right)\,dx.$ 1.18. $\int \frac{2x^3-\sqrt{x^5}+5}{x^2}\,dx.$

1.19. $\int \frac{3x^2-\sqrt{x^3}+7}{x^3}\,dx.$ 1.20. $\int \frac{3x^4-\sqrt[3]{x^2}+1}{x^2}\,dx.$ 1.21. $\int \left(\sqrt[5]{x^2}-\frac{2}{x^3}+4\right)\,dx.$

1.22. $\int \frac{\sqrt{x}-2x^3+6}{x}\,dx.$ 1.23. $\int \frac{\sqrt[5]{x}-2x^3+4}{x^2}\,dx.$ 1.24. $\int \left(\sqrt{x}-\frac{2x^2}{\sqrt{x^3}}+2\right)\,dx.$

1.25. $\int \frac{7\sqrt{x}-3x^2+x}{x\sqrt{x}}\,dx.$ 1.26. $\int \frac{\sqrt[3]{x}-5x+3}{x}\,dx.$ 1.27. $\int \frac{x^2-\sqrt[3]{x}+5}{\sqrt[3]{x}}\,dx.$

1.28. $\int \frac{\sqrt[7]{x^2}-3x^2+\sqrt{x}}{x\sqrt{x}}\,dx.$ 1.29. $\int \frac{\sqrt[3]{x^5}-7x+3}{x^2}\,dx.$ 1.30. $\int \frac{x^2-\sqrt[3]{x}+5}{x\sqrt[3]{x}}\,dx.$

2.1. $\int \sqrt{3+x}\,dx.$ 2.2. $\int \sqrt[3]{1+x}\,dx.$ 2.3. $\int \sqrt[3]{(1+x)^2}\,dx.$ 2.4. $\int \frac{dx}{\sqrt{1+x}}.$

2.5. $\int \frac{dx}{\sqrt{(1-x)^3}}.$ 2.6. $\int \frac{dx}{\sqrt[3]{2+x}}.$ 2.7. $\int (1-4x)^7\,dx.$ 2.8. $\int (1+4x)^5\,dx.$

2.9. $\int (1-3x)^3\,dx.$ 2.10. $\int \sqrt{1+3x}\,dx.$ 2.11. $\int \sqrt{5-4x}\,dx.$ 2.12. $\int \frac{dx}{\sqrt[3]{5+3x}}.$

2.13. $\int \frac{dx}{\sqrt[3]{(1-4x)^5}}.$ 2.14. $\int \frac{dx}{\sqrt[3]{(3-4x)^2}}.$ 2.15. $\int \frac{dx}{\sqrt[3]{2-5x}}.$ 2.16. $\int \sqrt[5]{3-2x}\,dx.$

2.17. $\int \frac{dx}{\sqrt{(3-x)^5}}.$ 2.18. $\int \frac{dx}{\sqrt[3]{3+x}}.$ 2.19. $\int \sqrt[4]{1+3x}\,dx.$ 2.20. $\int \sqrt[3]{3+2x}\,dx.$

2.21. $\int \frac{dx}{(2+x)^3}.$ 2.22. $\int \sqrt[5]{(6-5x)^2}\,dx.$ 2.23. $\int \sqrt{5-4x}\,dx.$ 2.24. $\int \sqrt[3]{5-2x}\,dx.$

2.25. $\int \frac{dx}{\sqrt[3]{(7-5x)^2}}.$ 2.26. $\int \frac{dx}{\sqrt{2+5x}}.$ 2.27. $\int \sqrt[3]{(4+x)^2}\,dx.$ 2.28. $\int \sqrt[3]{3-x}\,dx.$

2.29. $\int \frac{dx}{\sqrt{(3+7x)^3}}.$ 2.30. $\int \frac{dx}{\sqrt[4]{(9-7x)^5}}.$

3.1. $\int \frac{dx}{3-x}$. 3.2. $\int \frac{dx}{3x+9}$. 3.3. $\int \frac{dx}{2-3x}$. 3.4. $\int \frac{dx}{1-4x}$. 3.5. $\int \frac{dx}{2+3x}$.

3.6. $\int \frac{dx}{2-5x}$. 3.7. $\int \frac{dx}{3x-2}$. 3.8. $\int \frac{dx}{2x+3}$. 3.9. $\int \frac{dx}{3x-4}$. 3.10. $\int \frac{dx}{4-3x}$.

3.11. $\int \frac{dx}{3x+4}$. 3.12. $\int \frac{dx}{4x-2}$. 3.13. $\int \frac{dx}{5-3x}$. 3.14. $\int \frac{dx}{4-7x}$. 3.15. $\int \frac{dx}{5x-3}$.

3.16. $\int \frac{dx}{3-2x}$. 3.17. $\int \frac{dx}{5+3x}$ 3.18. $\int \frac{dx}{3-5x}$. 3.19. $\int \frac{dx}{5+4x}$. 3.20. $\int \frac{dx}{6-3x}$.

3.21. $\int \frac{dx}{6+5x}$. 3.22. $\int \frac{dx}{1-7x}$. 3.23 $\int \frac{dx}{1+6x}$. 3.24. $\int \frac{dx}{2+7x}$. 3.25. $\int \frac{dx}{7-2x}$.

3.26. $\int \frac{dx}{7-2x}$. 3.27. $\int \frac{dx}{2+7x}$ 3.28. $\int \frac{dx}{1-5x}$. 3.29. $\int \frac{dx}{7+5x}$. 3.30. $\int \frac{dx}{4-3x}$.

4.1. $\int \sin(2-3x)\,dx$. 4.2. $\int \sin(3-2x)\,dx$. 4.3. $\int \sin(5-3x)\,dx$. 4.4. $\int \cos(2+3x)\,dx$.

4.5. $\int \cos(3+2x)\,dx$. 4.6. $\int \sin(4-2x)\,dx$. 4.7. $\int \cos(5-2x)\,dx$. 4.8. $\int \cos(7x+3)\,dx$.

4.9. $\int \sin(8x-3)\,dx$. 4.10. $\int \sin(3+4x)\,dx$. 4.11. $\int \sin(3-4x)\,dx$. 4.12. $\int \cos(3+4x)\,dx$.

4.13. $\int \cos(3-4x)\,dx$. 4.14. $\int \cos(2+5x)\,dx$. 4.15. $\int \cos(3x+5)\,dx$. 4.16. $\int \sin(5x-3)\,dx$.

4.17. $\int \sin(5-3x)\,dx$. 4.18. $\int \sin(3x+6)\,dx$. 4.19. $\int \cos(5x-8)\,dx$. 4.20. $\int \cos(3x-7)\,dx$.

4.21. $\int \cos(5x-6)\,dx$. 4.22. $\int \sin(7x+1)\,dx$. 4.23. $\int \cos(5x-6)\,dx$. 4.24. $\int \sin(7-4x)\,dx$.

4.25. $\int \sin(3-x)\,dx$. 4.26. $\int \cos(5+3x)\,dx$. 4.27. $\int \cos(2x-1)\,dx$. 4.28. $\int \sin(5x-7)\,dx$.

4.29. $\int \sin(4-9x)\,dx$. 4.30. $\int \cos(5+7x)\,dx$.

5.1. $\int \frac{\sqrt{3}\,dx}{9x^2-3}$. 5.2. $\int \frac{dx}{\sqrt{9x^2+3}}$. 5.3. $\int \frac{dx}{9x^2+3}$. 5.4. $\int \frac{9\,dx}{\sqrt{9x^2-3}}$.

5.5. $\int \frac{dx}{\sqrt{3-9x^2}}$. 5.6. $\int \frac{dx}{7x^2-4}$. 5.7. $\int \frac{3\,dx}{\sqrt{7x^2-4}}$. 5.8. $\int \frac{dx}{5x^2+3}$.

5.9. $\int \frac{dx}{5x^2-3}$. 5.10. $\int \frac{dx}{\sqrt{3-5x^2}}$. 5.11. $\int \frac{dx}{\sqrt{5x^2+3}}$. 5.12. $\int \frac{dx}{\sqrt{4-7x^2}}$.

5.13. $\int \frac{\sqrt{5}\,dx}{\sqrt{3-4x^2}}$. 5.14. $\int \frac{dx}{\sqrt{2x^2-9}}$. 5.15. $\int \frac{dx}{2x^2+7}$. 5.16. $\int \frac{dx}{\sqrt{3x^2+1}}$.

5.17. $\int \frac{dx}{3x^2+1}$. 5.18. $\int \frac{\sqrt{2}\,dx}{\sqrt{7-2x^2}}$. 5.19. $\int \frac{\sqrt{14}\,dx}{2x^2-7}$. 5.20. $\int \frac{dx}{8x^2+9}$.

5.21. $\int \frac{dx}{3x^2-2}$. 5.22. $\int \frac{dx}{4x^2+9}$. 5.23. $\int \frac{dx}{\sqrt{4x^2+3}}$. 5.24. $\int \frac{dx}{\sqrt{3-4x^2}}$.

5.25. $\int \frac{dx}{\sqrt{5-4x^2}}$. 5.26. $\int \frac{dx}{4x^2-9}$. 5.27. $\int \frac{\sqrt{3}\,dx}{\sqrt{3x^2-25}}$. 5.28. $\int \frac{dx}{7x^2+3}$.

5.29. $\int \frac{dx}{\sqrt{4-9x^2}}$. 5.30. $\int \frac{dx}{9x^2-5}$.

6.1. $\int \frac{2x\,dx}{\sqrt{5-4x^2}}$. 6.2. $\int \frac{x\,dx}{\sqrt{5-3x^2}}$. 6.3. $\int \frac{3x\,dx}{4x^2+1}$. 6.4. $\int \frac{4x\,dx}{\sqrt{3-4x^2}}$.

6.5. $\int \frac{2x\,dx}{\sqrt{8x^2-9}}$. 6.6. $\int \frac{4x\,dx}{\sqrt{4x^2+3}}$. 6.7. $\int \frac{x\,dx}{\sqrt{9-8x^2}}$. 6.8. $\int \frac{\sqrt{3}x\,dx}{3x^2-2}$.

6.9. $\int \frac{2x\,dx}{\sqrt{3x^2-2}}$. 6.10. $\int \frac{2x\,dx}{7-2x^2}$. 6.11. $\int \frac{x\,dx}{2x^2-7}$. 6.12. $\int \frac{x\,dx}{3x^2+8}$.

6.13. $\int \frac{2x\,dx}{3x^2-7}$. 6.14. $\int \frac{2x\,dx}{\sqrt{2x^2+5}}$. 6.15. $\int \frac{x\,dx}{\sqrt{7-3x^2}}$. 6.16. $\int \frac{x\,dx}{2x^2+9}$.

6.17. $\int \frac{5x\,dx}{\sqrt{3-5x^2}}$. 6.18. $\int \frac{x\,dx}{\sqrt{3x^2+8}}$. 6.19. $\int \frac{5x\,dx}{\sqrt{5x^2+3}}$. 6.20. $\int \frac{x\,dx}{3x^2-6}$.

6.21. $\int \frac{x\,dx}{5x^2+1}$. 6.22. $\int \frac{5x\,dx}{5x^2-3}$. 6.23. $\int \frac{x\,dx}{2x^2-7}$. 6.24. $\int \frac{9x\,dx}{\sqrt{1-9x^2}}$.

6.25. $\int \frac{\sqrt{3}xdx}{3x^2-2}$. 6.26. $\int \frac{xdx}{4x^2+9}$. 6.27. $\int \frac{2xdx}{\sqrt{4x^2+3}}$. 6.28. $\int \frac{xdx}{\sqrt{3-4x^2}}$.

6.25. $\int \frac{xdx}{25-9x^2}$. 6.26. $\int \frac{\sqrt{2}xdx}{2x^2-11}$.

7.1. $\int e^{2x-7}dx$. 7.2. $\int e^{3+5x}dx$. 7.3. $\int e^{2-3x}dx$. 7.4. $\int e^{2x+1}dx$.

7.5. $\int e^{7x-2}dx$. 7.6. $\int e^{5x-7}dx$. 7.7. $\int e^{5x+7}dx$. 7.8. $\int e^{7-2x}dx$.

7.9. $\int e^{3-4x}dx$. 7.10. $\int e^{10x+2}dx$. 7.11. $\int e^{2x-10}dx$. 7.12. $\int e^{4x+3}dx$.

7.13. $\int e^{4x+5}dx$. 7.14. $\int e^{6x-1}dx$. 7.15. $\int e^{5-2x}dx$. 7.16. $\int e^{4-3x}dx$.

7.17. $\int e^{3-5x}dx$. 7.18. $\int e^{1-4x}dx$. 7.19. $\int e^{2-5x}dx$. 7.20. $\int e^{6x-4}dx$.

7.21. $\int e^{8x+1}dx$. 7.22. $\int e^{2-6x}dx$. 7.23. $\int e^{2-4x}dx$. 7.24. $\int e^{3-6x}dx$.

7.25. $\int e^{4-3x}dx$. 7.26. $\int e^{2x+5}dx$. 7.27. $\int e^{5x-7}dx$. 7.28. $\int e^{3x+11}dx$.

7.29. $\int e^{11x-3}dx$. 7.28. $\int e^{11-9x}dx$.

8.1. $\int \frac{7-x^2}{1-x}\,dx.$ 8.2. $\int \frac{x^3+2}{x^2-1}\,dx.$ 8.3. $\int \frac{8x^3-1}{2x+1}\,dx.$ 8.4. $\int \frac{x^5-2}{x^2-4}\,dx.$

8.5. $\int \frac{2x^4-3}{x^2+1}\,dx.$ 8.6. $\int \frac{x^3-1}{2x+1}\,dx.$ 8.7. $\int \frac{x^5}{1-x^3}\,dx.$ 8.8. $\int \frac{x^2}{x^2+3}\,dx.$

8.9. $\int \frac{x^4}{x^2-3}\,dx.$ 8.10. $\int \frac{x^3+5x}{x^2+1}\,dx.$ 8.11. $\int \frac{x^3-1}{x+3}\,dx.$ 8.12. $\int \frac{x^3}{x^2-1}\,dx.$

8.13. $\int \frac{x^4+1}{x^2+1}\,dx.$ 8.14. $\int \frac{x^3-3}{x+5}\,dx.$ 8.15. $\int \frac{x^3+1}{x^2+1}\,dx.$ 8.16. $\int \frac{1-2x^4}{x^2+1}\,dx.$

8.17. $\int \frac{2x^3-3}{x-2}\,dx.$ 8.18. $\int \frac{2x^2+5}{x+1}\,dx.$ 8.19. $\int \frac{x^2+x}{2-x}\,dx.$ 8.20. $\int \frac{2x^2+5}{x-7}\,dx.$

8.21. $\int \frac{2x^3+3}{x-1}\,dx.$ 8.22. $\int \frac{1-x^4}{x^2+4}\,dx.$ 8.23. $\int \frac{x^2+4}{x-3}\,dx.$ 8.24. $\int \frac{2x^2+3}{2x^2-1}\,dx.$

8.25. $\int \frac{x^3+x-1}{x^2+1}\,dx.$ 8.26. $\int \frac{x^2-5}{x^2+3}\,dx.$ 8.27. $\int \frac{3x^2-1}{x+7}\,dx.$ 8.28. $\int \frac{x^3-x+3}{x^2-1}\,dx.$

8.29. $\int \frac{x^3+x-1}{x+1}\,dx.$ 8.30. $\int \frac{5-x^2}{x^2+7}\,dx.$

9.1. $\int x\cos 5x\,dx.$ 9.2. $\int xe^{3x-5}\,dx.$ 9.3. $\int \frac{\ln(2x+1)}{x^3}\,dx.$

9.4. $\int (x+1)\cos 2x\,dx.$ 9.5. $\int (2-x)\cos 3x\,dx.$ 9.6. $\int \ln(x-1)\,dx.$

9.7. $\int (2x+1)\operatorname{arctg} x\,dx.$ 9.8. $\int \operatorname{arctg}\sqrt{2x-1}\,dx.$ 9.9. $\int \arcsin x\,dx.$

9.10. $\int \operatorname{arctg}\sqrt{4x-1}\,dx.$ 9.11. $\int \ln\left(x^2+4\right)\,dx.$ 9.12. $\int (x+5)\sin 3x\,dx.$

9.13. $\int (2-9x)e^{-3x}\,dx.$ 9.14. $\int (3x-2)\cos 5x\,dx.$ 9.15. $\int (2-3x)\sin 2x\,dx.$

9.16. $\int (4x-2)e^{-2x}\,dx.$ 9.17. $\int x^3\ln x\,dx.$ 9.18. $\int xe^{-3x}\,dx.$

9.19. $\int (4x-1)\cos 2x\,dx.$ 9.20. $\int (5x-2)e^{3x}\,dx.$ 9.21. $\int \left(x^2+4x\right)\cos x\,dx.$

9.22. $\int (3x+5)\sin x\,dx.$ 9.23. $\int (x+5)\operatorname{arctg} x\,dx.$ 9.24. $\int \arccos 2x\,dx.$

9.25. $\int (4x-1)\ln x\,dx.$ 9.26. $\int (7x-2)e^{-x}\,dx.$ 9.27. $\int \left(x^2+4x\right)\ln x\,dx.$

9.28. $\int (1-3x)\cos 7x\,dx.$ 9.29. $\int (9x-1)e^{7x}\,dx.$ 9.30. $\int \left(1-x^2\right)\ln 2x\,dx.$

Приклади інтегрування.

$$\int \frac{3x^2-2\sqrt{x}+5\sqrt[5]{x^3}}{x\sqrt{x}}\,dx = 3\int \frac{x^2}{x^{\frac{3}{2}}}\,dx - 2\int \frac{x^{\frac{1}{2}}}{x^{\frac{3}{2}}}\,dx + 5\int \frac{x^{\frac{3}{5}}}{x^{\frac{3}{2}}}\,dx =$$
$$= 3\int x^{2-\frac{3}{2}}\,dx - 2\int x^{\frac{1}{2}-\frac{3}{2}}\,dx + 5\int x^{\frac{3}{5}-\frac{3}{2}}\,dx = 3\int x^{\frac{1}{2}}\,dx - 2\int \frac{dx}{x} + 5\int x^{-\frac{9}{10}}\,dx =$$
$$= 3\frac{x^{\frac{1}{2}+1}}{\frac{1}{2}+1} - 2\ln|x| + 5\frac{x^{-\frac{9}{10}+1}}{-\frac{9}{10}+1} + C = 3\frac{x^{\frac{3}{2}}}{\frac{3}{2}} - 2\ln|x| + 5\frac{x^{\frac{1}{10}}}{\frac{1}{10}} + C =$$
$$= 2x^{\frac{3}{2}} - 2\ln|x| + 50x^{\frac{1}{10}} + C.$$

$$\int \sqrt[3]{5-2x}\,dx = \int (5-2x)^{\frac{1}{3}}\,dx = \left\| \begin{array}{l} u = 5-2x, \\ du = (5-2x)'dx = -2dx \\ dx = -\frac{1}{2}du \end{array} \right\| =$$
$$= -\frac{1}{2}\int u^{\frac{1}{3}}\,du = -\frac{1}{2}\frac{u^{\frac{1}{3}+1}}{\frac{1}{3}+1} + C = -\frac{1}{2}\frac{(5-2x)^{\frac{4}{3}}}{\frac{4}{3}} + C = -\frac{3}{8}(5-2x)^{\frac{4}{3}} + C.$$

$$\int \frac{dx}{2+7x} = \left\| \begin{array}{l} u = 2+7x, \\ du = (2+7x)'dx = 7dx \\ dx = \frac{1}{7}du \end{array} \right\| = \frac{1}{7}\int \frac{1}{u}\,du = \frac{1}{7}\ln|u| + C = \frac{1}{7}\ln|2+7x| + C.$$

$$\int \sin(3x+1)\,dx = \left\| \begin{array}{l} u = 3x+1, \\ du = (3x+1)'dx = 3dx \\ dx = \frac{1}{3}du \end{array} \right\| = \frac{1}{3}\int \sin u\,du = -\cos u + C = -\frac{1}{3}\cos(3x+1) + C.$$

$$\int \frac{dx}{7x^2+3} = \int \frac{dx}{\left(\sqrt{7}x\right)^2 + \left(\sqrt{3}\right)^2} = \frac{1}{\sqrt{7}}\int \frac{d\left(\sqrt{7}x\right)}{\left(\sqrt{7}x\right)^2 + \left(\sqrt{3}\right)^2} =$$
$$= \frac{1}{\sqrt{7}\sqrt{3}}\operatorname{arctg}\frac{\sqrt{7}x}{\sqrt{3}} + C = \frac{1}{\sqrt{21}}\operatorname{arctg}\sqrt{\frac{7}{3}}x + C.$$

$$\int \frac{2xdx}{\sqrt{4x^2+3}} = \left\| \begin{array}{l} xdx = \frac{1}{2}dx^2 \\ u = 4x^2+3, \\ du = (4x^2+3)'dx = 8xdx \\ xdx = \frac{1}{8}du \end{array} \right\| = \frac{2}{8}\int \frac{du}{\sqrt{u}} = \frac{1}{2}\sqrt{u} + C = \frac{1}{2}\sqrt{4x^2+3} + C.$$

$$\int \frac{x^2-5}{x^2+3}\,dx = \int \left(1 - \frac{8}{x^2+3}\right)\,dx = \int dx - 8\int \frac{dx}{x^2+3} = x - \frac{8}{\sqrt{3}}\operatorname{arctg}\frac{x}{\sqrt{3}} + C.$$

$$\int (7x-2)e^{-x}\,dx = \left\| \begin{array}{ll} u = 7x-2 & dv = e^{-x}\,dx \\ du = (7x-2)'dx = 7dx & v = \int e^{-x}\,dx = -e^{-x} \end{array} \right\| =$$
$$= -(7x-2)e^{-x} + \int e^{-x}\,dx = -(7x-2)e^{-x} - e^{-x} + C.$$