

Самостійна робота №1

1. – 9. Обчислити невизначені інтеграли.

Варіант 1

1. $\int \frac{\sqrt[4]{\operatorname{tg} x} dx}{\sin^2 x}$

2. $\int e^{-x^4} x^3 dx$

3. $\int x^3 \operatorname{arctg} x dx$

4. $\int \frac{(x^2 - 5) dx}{(x^2 - 4x + 5)(x^2 + 9)}$

5. $\int e^{4x} \cos 4x dx$

6. $\int \frac{dx}{x^2 \sqrt{x^2 - 9}}$

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

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

9. $\int \frac{3 \operatorname{ch} x}{2 \operatorname{sh} x + 3 \operatorname{ch} x} dx$

Варіант 2

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

2. $\int 2^{x^2} x dx$

3. $\int x^2 \operatorname{arctg} 4x dx$

4. $\int \frac{(x + 1) dx}{x(x^4 + 6x^2 + 8)}$

5. $\int e^{5x} \sin 5x dx$

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

7. $\int \frac{x^3 dx}{\sqrt{x^2 + x + 1}}$

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

9. $\int \frac{3}{2 \operatorname{sh} x + 3 \operatorname{ch} x} dx$

Варіант 3

1. $\int \frac{\ln(\arccos x) dx}{\arccos x \cdot \sqrt{1 - x^2}}$

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

3. $\int x^3 \sin 5x dx$

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

5. $\int x^2 e^x \sin x dx$

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

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

8. $\int \frac{x dx}{\sqrt[4]{x^3(x-4)}}$

9. $\int \frac{7}{2 \operatorname{sh} x - 4 \operatorname{ch} x} dx$

Варіант 4

1. $\int \frac{2x-4}{(x^2-4x+5)^3} dx$

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

3. $\int \operatorname{arctg}(7x+2) dx$

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

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

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

7. $\int \frac{x+3}{\sqrt{4x^2+4x+3}} dx$

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

9. $\int \frac{\operatorname{ch} x+2}{2\operatorname{sh} x+3\operatorname{ch} x} dx$

Варіант 5

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

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

3. $\int x \arcsin x dx$

4. $\int \frac{(x^4-1)dx}{(x^2+9)(x^3+x^2)}$

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

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

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

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

9. $\int \frac{\operatorname{sh} x+2}{2\operatorname{sh} x+5\operatorname{ch} x} dx$

Варіант 6

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

2. $\int e^{3x^2-5} x dx$

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

4. $\int \frac{x^3+2x^2+3x+4}{x^4+x^3+2x^2} dx$

5. $\int e^x \sin 2x dx$

6. $\int \frac{dx}{\sqrt[4]{(x+2)^5(x-1)^3}}$

7. $\int \frac{(x^3-2x^2+1)dx}{\sqrt{x^2-7x+10}}$

8. $\int \frac{x dx}{\sqrt{1+\sqrt[3]{x^2}}}$

9. $\int \frac{\operatorname{sh} x-2}{2\operatorname{sh} x+\operatorname{ch} x} dx$

Варіант 7

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

2. $\int \frac{3x^2 dx}{x^6 - 25}$

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

4. $\int \frac{(3x^2 + 4x - 1) dx}{(x^2 + 4x + 29)^2}$

5. $\int e^x \cos 2x dx$

6. $\int \frac{dx}{2\sqrt{x} - \sqrt[3]{x} - \sqrt[4]{x}}$

7. $\int \frac{(x^2 + 4x) dx}{\sqrt{x^2 + x + 1}}$

8. $\int \sqrt[3]{x + 2x^3} dx$

9. $\int \frac{\operatorname{sh} x}{2\operatorname{sh} x + \operatorname{ch} x} dx$

Варіант 8

1. $\int e^{2x^2 + \ln x} dx$

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

3. $\int \operatorname{arctg} 2x dx$

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

5. $\int e^{2x} \cos 3x dx$

6. $\int \frac{1 - \sqrt{x+1}}{1 + \sqrt[3]{x+1}} dx$

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

8. $\int \sqrt[3]{x - x^3} dx$

9. $\int \frac{\operatorname{th} x}{2\operatorname{sh} x + \operatorname{ch} x} dx$

Варіант 9

1. $\int \frac{e^{\operatorname{tg} x} + \operatorname{ctg} x}{\cos^2 x} dx$

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

3. $\int x^2 \ln x dx$

4. $\int \frac{(x^4 - 1) dx}{(x^2 + 9)(x^3 + x^2)}$

6. $\int e^{2x} \sin 3x dx$

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

8. $\int x^2 \sqrt{x^2 + 4} dx$

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

11. $\int \frac{\operatorname{ch} x + 1}{2\operatorname{sh} x - 5\operatorname{ch} x} dx$

Варіант 10

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

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

3. $\int (x+2) \cos 3x dx$

4. $\int \frac{20 dx}{(x+4)(x^2 + 4x + 20)}$

5. $\int e^{2x+1} \sin x dx$

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

7. $\int \frac{(x^3 - 6x^2 + 11x - 6) dx}{\sqrt{x^2 + 4x + 3}}$

8. $\int x^{-1/2} (1 + x^{1/4})^{-10} dx$

9. $\int \frac{\operatorname{ch} x - 1}{2\operatorname{sh} x - 5\operatorname{ch} x} dx$

Варіант 11

1. $\int \frac{x^3 dx}{x^8 - 18}$

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

3. $\int (x^2 - 2x + 3) \ln(x+1) dx$

4. $\int \frac{(x+5) dx}{(x+2)^2 (x^4 - 1)}$

5. $\int e^{2x+1} \cos x dx$

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

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

8. $\int \frac{dx}{x \sqrt{x^6 + 1}}$

9. $\int \frac{\operatorname{sh} x - 1}{2 \operatorname{sh} x + 5 \operatorname{ch} x} dx$

Варіант 12

1. $\int \frac{e^x dx}{\sqrt{4 - e^{2x}}}$

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

3. $\int \arccos(3x-2) dx$

4. $\int \frac{(2x^3 + 3) dx}{(4x^2 - 1)(x^2 + 6x)}$

5. $\int e^{4x} \sin 4x dx$

6. $\int \frac{dx}{\sqrt{(x-7)^7 (x-5)^5}}$

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

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

9. $\int \frac{3 \operatorname{sh} x}{2 \operatorname{sh} x + \operatorname{ch} x} dx$

Варіант 13

1. $\int e^x \sin(e^x) dx$

2. $\int \frac{dx}{\sqrt{3-2x}}$

3. $\int (x^2 - 5) \cos 4x dx$

4. $\int \frac{x-1}{x^2 + 6x + 8} dx$

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

6. $\int \frac{dx}{\sqrt[5]{(x-1)^6 (x+2)^4}}$

7. $\int \frac{x^4 dx}{\sqrt{x^2 + 4x + 5}}$

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

9. $\int \frac{\operatorname{ch} x + \operatorname{sh} x}{2 \operatorname{sh} x - \operatorname{ch} x} dx$

Варіант 14

1. $\int \frac{\sqrt[4]{\operatorname{tg} x} dx}{\sin^2 x}$

2. $\int e^{-x^4} x^3 dx$

3. $\int x^3 \operatorname{arctg} x dx$

4. $\int \frac{(x^2 - 5) dx}{(x^2 - 4x + 5)(x^2 + 9)}$

5. $\int e^{4x} \cos 4x dx$

6. $\int \frac{dx}{x^2 \sqrt{x^2 - 9}}$

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

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

9. $\int \frac{3 \operatorname{ch} x}{2 \operatorname{sh} x + 3 \operatorname{ch} x} dx$

Варіант 15

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

2. $\int 2^{x^2} x dx$

3. $\int x^2 \operatorname{arctg} 4x dx$

4. $\int \frac{(x+1)dx}{x(x^4+6x^2+8)}$

5. $\int e^{5x} \sin 5x dx$

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

7. $\int \frac{x^3 dx}{\sqrt{x^2+x+1}}$

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

9. $\int \frac{3}{2 \operatorname{sh} x + 3 \operatorname{ch} x} dx$

Варіант 16

1. $\int \frac{\ln(\arccos x) dx}{\arccos x \cdot \sqrt{1-x^2}}$

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

3. $\int x^3 \sin 5x dx$

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

5. $\int x^2 e^x \sin x dx$

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

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

8. $\int \frac{x dx}{\sqrt[4]{x^3(x-4)}}$

9. $\int \frac{7}{2 \operatorname{sh} x - 4 \operatorname{ch} x} dx$

Варіант 17

1. $\int \frac{2x-4}{(x^2-4x+5)^3} dx$

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

3. $\int \operatorname{arctg}(7x+2) dx$

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

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

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

7. $\int \frac{x+3}{\sqrt{4x^2+4x+3}} dx$

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

9. $\int \frac{\operatorname{ch} x + 2}{2 \operatorname{sh} x + 3 \operatorname{ch} x} dx$

Варіант 18

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

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

3. $\int x \arcsin x dx$

4. $\int \frac{(x^4-1)dx}{(x^2+9)(x^3+x^2)}$

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

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

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

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

9. $\int \frac{\operatorname{sh} x + 2}{2 \operatorname{sh} x + 5 \operatorname{ch} x} dx$

Варіант 19

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

$$2. \int e^{3x^2-5} x dx$$

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

$$4. \int \frac{x^3 + 2x^2 + 3x + 4}{x^4 + x^3 + 2x^2} dx$$

$$5. \int e^x \sin 2x dx$$

$$6. \int \frac{dx}{\sqrt[4]{(x+2)^5 (x-1)^3}}$$

$$7. \int \frac{(x^3 - 2x^2 + 1) dx}{\sqrt{x^2 - 7x + 10}}$$

$$8. \int \frac{x dx}{\sqrt{1 + \sqrt[3]{x^2}}}$$

$$9. \int \frac{\operatorname{sh} x - 2}{2 \operatorname{sh} x + \operatorname{ch} x} dx$$

Варіант 20

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

$$2. \int \frac{3x^2 dx}{x^6 - 25}$$

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

$$4. \int \frac{(3x^2 + 4x - 1) dx}{(x^2 + 4x + 29)^2}$$

$$5. \int e^x \cos 2x dx$$

$$6. \int \frac{dx}{2\sqrt{x} - \sqrt[3]{x} - \sqrt[4]{x}}$$

$$7. \int \frac{(x^2 + 4x) dx}{\sqrt{x^2 + x + 1}}$$

$$8. \int \sqrt[3]{x + 2x^3} dx$$

$$9. \int \frac{\operatorname{sh} x}{2 \operatorname{sh} x + \operatorname{ch} x} dx$$

Варіант 21

$$1. \int e^{2x^2 + \ln x} dx$$

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

$$3. \int \operatorname{arctg} 2x dx$$

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

$$5. \int e^{2x} \cos 3x dx$$

$$6. \int \frac{1 - \sqrt{x+1}}{1 + \sqrt[3]{x+1}} dx$$

$$7. \int \frac{(x^3 - x - 1) dx}{\sqrt{x^2 + 2x + 2}}$$

$$8. \int \sqrt[3]{x - x^3} dx$$

$$9. \int \frac{\operatorname{th} x}{2 \operatorname{sh} x + \operatorname{ch} x} dx$$

Варіант 22

$$1. \int \frac{e^{\operatorname{tg} x} + \operatorname{ctg} x}{\cos^2 x} dx$$

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

$$3. \int x^2 \ln x dx$$

$$4. \int \frac{(x^4 - 1) dx}{(x^2 + 9)(x^3 + x^2)}$$

$$6. \int e^{2x} \sin 3x dx$$

$$7. \int \frac{dx}{\sqrt[3]{4x^2 + 4x + 1} - \sqrt{2x + 1}}$$

$$8. \int x^2 \sqrt{x^2 + 4} dx$$

$$9. \int \frac{dx}{x^3 \sqrt[3]{2 - x^3}}$$

$$11. \int \frac{\operatorname{ch} x + 1}{2 \operatorname{sh} x - 5 \operatorname{ch} x} dx$$

Варіант 23

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

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

3. $\int (x+2) \cos 3x dx$

4. $\int \frac{20dx}{(x+4)(x^2+4x+20)}$

5. $\int e^{2x+1} \sin x dx$

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

7. $\int \frac{(x^3 - 6x^2 + 11x - 6)dx}{\sqrt{x^2 + 4x + 3}}$

8. $\int x^{-1/2} (1 + x^{1/4})^{-10} dx$

9. $\int \frac{\operatorname{ch} x - 1}{2 \operatorname{sh} x - 5 \operatorname{ch} x} dx$

Варіант 24

1. $\int \frac{x^3 dx}{x^8 - 18}$

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

3. $\int (x^2 - 2x + 3) \ln(x+1) dx$

4. $\int \frac{(x+5)dx}{(x+2)^2(x^4-1)}$

5. $\int e^{2x+1} \cos x dx$

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

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

8. $\int \frac{dx}{x^6 \sqrt{x^6 + 1}}$

9. $\int \frac{\operatorname{sh} x - 1}{2 \operatorname{sh} x + 5 \operatorname{ch} x} dx$

Варіант 25

1. $\int \frac{e^x dx}{\sqrt{4 - e^{2x}}}$

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

3. $\int \arccos(3x-2) dx$

4. $\int \frac{(2x^3 + 3)dx}{(4x^2 - 1)(x^2 + 6x)}$

5. $\int e^{4x} \sin 4x dx$

6. $\int \frac{dx}{\sqrt{(x-7)^7 (x-5)^5}}$

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

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

9. $\int \frac{3 \operatorname{sh} x}{2 \operatorname{sh} x + \operatorname{ch} x} dx$

Варіант 26

1. $\int e^x \sin(e^x) dx$

2. $\int \frac{dx}{\sqrt{3-2x}}$

3. $\int (x^2 - 5) \cos 4x dx$

4. $\int \frac{x-1}{x^2 + 6x + 8} dx$

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

6. $\int \frac{dx}{\sqrt[5]{(x-1)^6 (x+2)^4}}$

7. $\int \frac{x^4 dx}{\sqrt{x^2 + 4x + 5}}$

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

9. $\int \frac{\operatorname{ch} x + \operatorname{sh} x}{2 \operatorname{sh} x - \operatorname{ch} x} dx$

Варіант 27

1. $\int \frac{\sqrt[4]{\operatorname{tg} x} dx}{\sin^2 x}$

2. $\int e^{-x^4} x^3 dx$

3. $\int x^3 \operatorname{arctg} x dx$

4. $\int \frac{(x^2 - 5) dx}{(x^2 - 4x + 5)(x^2 + 9)}$

5. $\int e^{4x} \cos 4x dx$

6. $\int \frac{dx}{x^2 \sqrt{x^2 - 9}}$

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

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

9. $\int \frac{3 \operatorname{ch} x}{2 \operatorname{sh} x + 3 \operatorname{ch} x} dx$

Варіант 28

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

2. $\int 2^{x^2} x dx$

3. $\int x^2 \operatorname{arctg} 4x dx$

4. $\int \frac{(x + 1) dx}{x(x^4 + 6x^2 + 8)}$

5. $\int e^{5x} \sin 5x dx$

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

7. $\int \frac{x^3 dx}{\sqrt{x^2 + x + 1}}$

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

9. $\int \frac{3}{2 \operatorname{sh} x + 3 \operatorname{ch} x} dx$

Варіант 29

1. $\int \frac{\ln(\arccos x) dx}{\arccos x \cdot \sqrt{1 - x^2}}$

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

3. $\int x^3 \sin 5x dx$

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

5. $\int x^2 e^x \sin x dx$

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

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

8. $\int \frac{x dx}{\sqrt[4]{x^3(x-4)}}$

9. $\int \frac{7}{2 \operatorname{sh} x - 4 \operatorname{ch} x} dx$

Варіант 30

1. $\int \frac{2x - 4}{(x^2 - 4x + 5)^3} dx$

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

3. $\int \operatorname{arctg}(7x + 2) dx$

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

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

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

7. $\int \frac{x + 3}{\sqrt{4x^2 + 4x + 3}} dx$

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

9. $\int \frac{\operatorname{ch} x + 2}{2 \operatorname{sh} x + 3 \operatorname{ch} x} dx$