ТИПОВОЙ РАСЧЕТ
«Интегральное исчисление»
ЗАДАНИЯ

Найти неопределённые интегралы путем:

1) внесения переменной под знак дифференциала;

2) использования тригонометрических формул;

3) интегрирования по частям;

4) интегрирования дробно-рациональных выражений 1-го типа;

5) интегрирования дробно-рациональных выражений 2-го типа;

6) интегрирования дробно-рациональных выражений 3-го типа;

7) применения универсальной тригонометрической подстановки $t = \operatorname{tg}\frac{x}{2}$;

8) применения формул понижения степени в тригонометрических выражениях.

9) Интегрирование иррациональных функций (замена на t^2).

10) Интегрирование иррациональных функций (тригонометрические подстановки).

11)-12) Вычислить определённые интегралы.

13)-15) Вычислить площадь области D, ограниченной графиками данных функций.

16)-18) Вычислить длину дуги кривой L.

19) Вычислить объем тела V, ограниченного заданными поверхностями.

20) Вычислить объем тела V, образованного вращением данной линии вокруг заданной оси (0x или 0y).

21), 23) Вычислить несобственные интегралы.

22), 24) Исследовать сходимость несобственных интегралов.

Вариант 1

1. $\int \frac{\operatorname{arctg} x\,dx}{1+x^2}$	2. $\int \cos 2x \cos 4x\,dx$
3. $\int (x^2+1)e^{2x}dx$	4. $\int \frac{x^2+8}{2-x^2-x}dx$
5. $\int \frac{2x^2+7x+7}{(x+1)^2(x+2)}dx$	6. $\int \frac{3x^2+7x+5}{(x+1)(x^2+2x+2)}dx$
7. $\int \frac{dx}{2\sin x-3\cos x+2}$	8. $\int \sin^4 x\,dx$
9. $\int \sqrt{\frac{2x-1}{4-2x}}dx$	10. $\int \frac{x^2\,dx}{\sqrt{4-x^2}}$
11. $\int_0^{\frac{\pi}{3}} x\cos x\,dx$	12. $\int_{\frac{\pi}{2}}^{2\operatorname{arctg}2} \frac{dx}{\sin^2 x(1-\cos x)}$
13. D: $2x=y^2,\ 2y=x^2$	14. D: $\begin{cases} x=t-\sin t, \\ y=1-\cos t, \end{cases}$ $(0\le t\le 2\pi)\ \ y=0$
15. $D:\rho=2\cos 2\varphi,\ 0\le\varphi\le\frac{\pi}{2}$	16. L: $y=\ln x;\ 2\le x\le 4$
17. $L:\begin{cases} x=3(t-\sin t), \\ y=3(1-\cos t),\ 0\le t\le\frac{\pi}{2} \end{cases}$	18. $L:\rho=e^{\frac{3\varphi}{4}};\ 0\le\varphi\le\frac{\pi}{2}$
19. $V: x^2+y^2+\frac{z^2}{4}=1,$ $z=0;\ z=1$	20. $y^2=4x;\ 0\le x\le 2\ \ (0x)$
21. $\int_0^{+\infty} \frac{dx}{x^2+2x+2}$	22. $\int_1^{+\infty} \frac{\sqrt{x}dx}{\sqrt{(x+1)(x+2)^2}}$
23. $\int_2^3 \frac{2x}{\sqrt{x^2-4}}dx$	24. $\int_2^3 \frac{e^x}{(x-3)^2}dx$

Вариант 2

1. $\int \frac{\sqrt{\ln x}}{x}\,dx$	2. $\int \sin x \cos 3x\,dx$
3. $\int \left(x^2 - x + 1\right)\sin x\,dx$	4. $\int \frac{x^3 + x^2 + 2x + 3}{x^2 + x}\,dx$
5. $\int \frac{7x^3 - 3x^2 - 2x + 2}{x^3(x-1)}\,dx$	6. $\int \frac{5x^2 + 11}{(x-1)\left(x^2 + 2x + 5\right)}\,dx$
7. $\int \frac{dx}{\cos x + 2\sin x - 1}$	8. $\int \sin^2 3x \cos^2 3x\,dx$
9. $\int \frac{x\,dx}{4 + \sqrt{2x+3}}$	10. $\int \frac{dx}{\left(\sqrt{x^2+9}\right)^3}$
11. $\int\limits_0^{\frac{\sqrt{3}}{3}} \arccos x\,dx$	12. $\int\limits_0^{\frac{\pi}{2}} \frac{\cos x - \sin x}{(1+\sin x)^2}\,dx$
13. D: $y = x^2,\ x + y = 2$	14. D: $\begin{cases} x = 16\cos^3 t, \\ y = 2\sin^3 t, \\ x = 2\ (x \ge 2) \end{cases}$
15. D: $\rho = \sin 2\varphi, 0 \le \varphi \le \frac{\pi}{2}$	16. $L: y = \frac{x^2}{2} - \ln x;\ 2 \le x \le 4$
17. $L: \begin{cases} x = 3\cos^3 t, \\ y = 3\sin^3 t, 0 \le t \le \frac{\pi}{2}. \end{cases}$	18. $L: \rho = a\varphi;\ 0 \le \varphi \le 2\pi$
19. $V: z = \frac{x^2}{4} + \frac{y^2}{2},\ z = 1$	20. $y = \frac{b}{a}\sqrt{a^2 - x^2}$; $0 \le x \le a$ $(0x)$
21. $\int\limits_1^{+\infty} \frac{dx}{x^2 + 2x}$	22. $\int\limits_1^{+\infty} \frac{x+7}{5x^4 + 3x^2 + 2}\,dx$
23. $\int\limits_2^3 \frac{2}{\sqrt{x^2 - 4}}\,dx$	24. $\int\limits_0^1 \frac{\cos x}{\sqrt[3]{x}}\,dx$

Вариант 3

1. $\int \sin x\, e^{\cos x}\, dx$	2. $\int \sin 2x \sin 5x\, dx$
3. $\int \ln\left(x^2+4\right) dx$	4. $\int \dfrac{5x^2-8}{x^2-3x+2} dx$
5. $\int \dfrac{2x^2-7x+8}{(x-2)^2(x-1)} dx$	6. $\int \dfrac{2x^2-12x+1}{(x+1)\left(x^2-2x+2\right)} dx$
7. $\int \dfrac{\cos x\, dx}{3-\cos x}$	8. $\int \sin^4 x \cos^2 x\, dx$
9. $\int \sqrt{\dfrac{x+2}{x+4}} dx$	10. $\int \dfrac{\sqrt{x^2-1}}{x^4} dx$
11. $\int\limits_0^{\frac{\pi}{3}} \dfrac{x \sin x}{\cos^3 x} dx$	12. $\int\limits_{\frac{\pi}{2}}^{2\operatorname{arctg}2} \dfrac{dx}{\sin^2 x(1+\cos x)}$
13. $D: y=2x-x^2,\ x+y=0$	14. $D: \begin{cases} x=3\cos t, \\ y=8\sin t, \\ y=4\sqrt{3} \quad (y \ge 4\sqrt{3}) \end{cases}$
15. $D: \quad \rho = a\cos 3\varphi, \quad -\dfrac{\pi}{6} \le \varphi \le \dfrac{\pi}{6}$	16. $L: y=\sqrt{1-x^2}+\arcsin x; \quad 2 \le x \le 0{,}5$
17. $L: \begin{cases} x=2\cos t-\cos 2t, \\ y=2\sin t-\sin 2t, \end{cases} 0 \le t \le \pi$	18. $L: \rho = e^{\frac{4\varphi}{3}};\ 0 \le \varphi \le \pi$
19. $V: \dfrac{x^2}{4}+\dfrac{y^2}{2}=1,$ $z=0 \quad z=1, \ (y \ge 0)$	20. $y=2\left(1-\dfrac{x^2}{4}\right);\ 0 \le x \le 2$ $(0x)$
21. $\int\limits_0^{+\infty} \dfrac{dx}{x^2+4x+8}$	22. $\int\limits_1^{+\infty} \dfrac{3+\sin x}{\sqrt[3]{x}} dx$
23. $\int\limits_4^5 \dfrac{5x}{\sqrt{25-x^2}} dx$	24. $\int\limits_3^5 \dfrac{\sin x}{(x-5)^3} dx$

Вариант 4

1. $\int \frac{x^3\,dx}{x^4+1}$	2. $\int \cos 2x \cos 6x\,dx$
3. $\int (x+5)^2 \cos 2x dx$	4. $\int \frac{2x^3+6x^2+x-3}{x^2+3x} dx$
5. $\int \frac{x^2+3x+3}{x^3(x+1)} dx$	6. $\int \frac{10-3x^2-3x}{(x-1)(x^2-2x+5)} dx$
7. $\int \frac{\sin x-1}{5\sin x+13} dx$	8. $\int \cos^4 5x\,dx$
9. $\int \frac{3-2x}{5+\sqrt{2x+1}} dx$	10. $\int \sqrt{4-x^2} dx$
11. $\int_0^{\frac{1}{\sqrt{3}}} x \operatorname{arctg} x\,dx$	12. $\int_0^{\frac{\pi}{2}} \frac{\cos x\,dx}{5+4\cos x}$
13. D: $y=\lvert\lg x\rvert$, $y=0$, $x=0{,}1$; $x=10$	14. D: $\begin{cases} x=4(t-\sin t), \\ y=4(1-\cos t), \end{cases}$ $y=6$, $(0<x<8\pi,\ y\ge 6)$
15. D: $\rho=2a(2+\cos\varphi)$, $0\le\varphi\le 2\pi$	16. L: $y=\ln\frac{2}{x}$; $1\le x\le\sqrt{3}$
17. $L: \begin{cases} x=\cos t+t\sin t, \\ y=\sin t-t\cos t, \end{cases} 0\le t\le 1$	18. L: $\rho=\frac{1}{\varphi}$; $\frac{1}{2}\le\varphi\le 1$
19. V: $z=x^2+4y^2$, $z=1$	20. $y=\sqrt{4-x^2}$; $0\le x\le 1$ $(0x)$
21. $\int_2^{+\infty} \frac{dx}{x^2+4x}$	22. $\int_1^{+\infty} \frac{\operatorname{arctg} x}{x^3+7x+1} dx$
23. $\int_{2,5}^{5} \frac{dx}{\sqrt{25-x^2}}$	24. $\int_0^1 \frac{x\,dx}{\sqrt{1-x}}$

Вариант 5

1. $\int \frac{\arcsin^2 x\,dx}{\sqrt{1-x^2}}$	2. $\int \sin 2x \sin 3x\,dx$
3. $\int \left(3-x+2x^2\right)e^x dx$	4. $\int \frac{3x^2+26}{x^2+x-12}dx$
5. $\int \frac{5x^2+4x-7}{(x+2)^2(x-3)}dx$	6. $\int \frac{5x^2+15x+12}{(x+2)(x^2+4x+5)}dx$
7. $\int \frac{dx}{8\cos x-10}$	8. $\int \sin^2\frac{3x}{3}\cos^2\frac{3x}{2}dx$
9. $\int \sqrt{\frac{x-5}{x+3}}dx$	10. $\int \frac{x^4\,dx}{\sqrt{9-x^2}}$
11. $\int_0^{\frac{\sqrt{2}}{2}} x\arcsin x\,dx$	12. $\int_{2\operatorname{arctg}\frac{1}{3}}^{2\operatorname{arctg}\frac{1}{2}} \frac{dx}{\sin x(1-\sin x)}$
13. D: $y=2^x$, $y=2$, $x=0$	14. D: $\begin{cases} x=\frac{3}{4}\cos^3 t, \\ y=3\sin^3 t \end{cases}$
15. D: $\rho=a\operatorname{tg}\varphi$, $0\le\varphi\le\frac{\pi}{4}$	16. L: $y=\ln\cos x$; $0\le x\le\frac{\pi}{4}$
17. L: $\begin{cases} x=\cos t-\frac{\cos 2t}{2}, \\ y=\sin t-\frac{1}{2}\sin 2t, \frac{\pi}{3}\le t\le\frac{\pi}{2} \end{cases}$	18. L: $\rho=2e^{\varphi}$; $0\le\varphi\le\frac{\pi}{2}$
19. V: $\frac{x^2}{9}+\frac{y^2}{4}-z^2=1$, $z=0$; $z=1$	20. $y=\sqrt{x-3}$; $3\le x\le 7$ $(0x)$
21. $\int_0^{+\infty} \frac{dx}{x^2-2x+2}$	22. $\int_1^{+\infty} \frac{x}{\sqrt{1+x^3}}dx$
23. $\int_3^4 \frac{3x}{\sqrt{x^2-9}}dx$	24. $\int_9^{10} \frac{\cos^2 x}{\sqrt[3]{(x-9)^5}}dx$

Вариант 6

1. $\int x^2\sqrt{1-x^3}\,dx$	2. $\int \sin 4x \cos 5x\,dx$
3. $\int \operatorname{arctg}(3x)\,dx$	4. $\int \dfrac{3x^2+12x+1}{x^2-1}\,dx$
5. $\int \dfrac{5x^3+4x^2-2x-4}{x^3(x+2)}\,dx$	6. $\int \dfrac{3x+14}{(x-2)(x^2+4x+8)}\,dx$
7. $\int \dfrac{dx}{7\cos x-6\sin x+9}$	8. $\int \sin^4 2x\,dx$
9. $\int \sqrt{\dfrac{2x+1}{2x+2}}\,dx$	10. $\int \dfrac{dx}{\left(\sqrt{1-x^2}\right)^3}$
11. $\int\limits_1^e x^2 \ln x\,dx$	12. $\int\limits_{\frac{\pi}{3}}^{\frac{\pi}{2}} \dfrac{\cos x\,dx}{1+\sin x-\cos x}$
13. D: $y=(x+1)^2$, $x=\sin \pi y$, $y=0$, $(0\le y\le 1)$	14. $D:\begin{cases} x=2\cos t,\ y=3, \\ y=6\sin t, (y\ge 3) \end{cases}$
15. D: $\rho=1-\sin\varphi$, $-\dfrac{\pi}{4}\le\varphi\le\dfrac{\pi}{4}$	16. L: $y=e^x+1$; $0\le x\le 1$
17. $L:\begin{cases} x=(t^2-2)\sin t-2t\cos t, \\ y=(2-t^2)\cos t+2t\sin t, \end{cases} \dfrac{\pi}{2}\le t\le\pi$	18. L: $\rho=1+\cos\varphi$; $0\le\varphi\le 1$
19. V: $\dfrac{x^2}{9}+\dfrac{y^2}{4}-\dfrac{z^2}{36}=-1$, $z=8$	20. $y=\operatorname{ch} x$; $0\le x\le 1$ $(0x)$
21. $\int\limits_0^{+\infty} \dfrac{dx}{x^2+2x+2}$	22. $\int\limits_1^{\infty} \dfrac{2+\cos x}{x^2+1}\,dx$
23. $\int\limits_3^4 \dfrac{3}{\sqrt{x^2-9}}\,dx$	24. $\int\limits_0^1 \dfrac{\sin^2 x}{\sqrt{1-x^2}}\,dx$

Вариант 7

1. $\int \frac{\cos x + 1}{\sin x + x} dx$	2. $\int \sin 7x \cos x \, dx$
3. $\int (4x^2 - 3)\cos x \, dx$	4. $\int \frac{9x^2 + 24}{x^2 + 7x + 10} dx$
5. $\int \frac{6x^2 + x - 19}{(x-1)^2(x+3)} dx$	6. $\int \frac{4x^2 - 9x + 17}{(x+2)(x^2 - 4x + 5)} dx$
7. $\int \frac{dx}{4\sin x + 5}$	8. $\int \sin^2 \frac{x}{2} \cos^4 \frac{x}{2} dx$
9. $\int \frac{dx}{1 + \sqrt{x+1}}$	10. $\int \frac{\sqrt{x^2 - 25}}{x^4} dx$
11. $\int_1^e x \ln x \, dx$	12. $\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \frac{\sin x \, dx}{1 + \cos x + \sin x}$
13. $D: y = x,\ y = x + \sin^2 x,$ $(0 \le x \le \pi)$	14. $D: \begin{cases} x = \sqrt{2}\cos t, \\ y = 4\sqrt{2}\sin t, \end{cases}$ $y = 4,\ (y \ge 4)$
15. $D: \rho = 3(1 + \sin\varphi),\ -\frac{\pi}{3} \le \varphi \le 0$	16. $L: y = \arcsin\sqrt{x} + \sqrt{x - x^2};$ $0 \le x \le 1$
17. $L: \begin{cases} x = 2(t - \sin t), \\ y = 2(1 - \cos t), \end{cases} 0 \le t \le \pi$	18. $L: \rho = \sin^3 \frac{\varphi}{3};\ 0 \le \varphi \le \pi$
19. $V: \frac{x^2}{16} + \frac{y^2}{9} + \frac{z^2}{4} = 1,$ $z = -1,\ z = 1$	20. $y = -x^2 + 5x - 4;$ $y \ge 0$ $(0x)$
21. $\int_0^{+\infty} \frac{dx}{x^2 - 4x + 8}$	22. $\int_1^{+\infty} \frac{5 - \cos x}{\sqrt{x^2 + x + 1}} dx$
23. $\int_1^2 \frac{x}{\sqrt[3]{x-1}} dx$	24. $\int_4^6 \frac{x^2 + 7}{\sqrt{(x-4)^3}} dx$

Вариант 8

1. $\int \frac{e^x dx}{e^x + 2}$	2. $\int \cos 4x \cos x \, dx$
3. $\int (x^2 + 2x - 3)\sin(4x)\, dx$	4. $\int \frac{4x^2 - 14x - 108}{x^2 - 4x - 21} dx$
5. $\int \frac{x^3 - 10x^2 - 3x + 6}{x^3(x-2)} dx$	6. $\int \frac{4x^2 - 11x + 14}{(x-2)(x^2 - 4x + 8)} dx$
7. $\int \frac{dx}{9\cos x + 6\sin x + 11}$	8. $\int \sin^2 x \cos^2 x \, dx$
9. $\int \sqrt{\frac{x-2}{x+2}}\, dx$	10. $\int \frac{dx}{\left(\sqrt{x^2+4}\right)^3}$
11. $\int_0^{\frac{\pi}{2}} \frac{x \arccos x}{\sqrt{1-x^2}} dx$	12. $\int_0^{\frac{\pi}{2}} \frac{\cos x \, dx}{1 + \cos x + \sin x}$
13. $D: y = \frac{1}{1+x}$, $y = 0$, $0 \le x \le 2$	14. $D: \begin{cases} x = 8\cos^3 t, \ x = 1, \\ y = 8\sin^3 t, \ (x \ge 1) \end{cases}$
15. $D: \rho = 4(1 - \cos\varphi)$, $-\frac{\pi}{4} \le \varphi \le 0$	16. $L: y = \ln(x^2 - 1)$; $3 \le x \le 5$
17. $L: \begin{cases} x = e^t(\cos t + \sin t), \\ y = e^t(\cos t - \sin t), \end{cases} \frac{\pi}{2} \le t \le \pi$	18. $L: \rho = 1 - \sin\varphi$; $0 \le \varphi \le \frac{\pi}{6}$
19. $V: x^2 + \frac{y^2}{4} = 9$, $z = 0$, $z = x\ (x \ge 0)$	20. $y = -x^2 + 2x$; $y \ge 0$ $(0x)$
21. $\int_5^{+\infty} \frac{dx}{x^2 - 4x}$	22. $\int_1^{+\infty} \frac{\cos^2 x}{e^x} dx$
23. $\int_0^1 \frac{x}{\sqrt[3]{1-x^2}} dx$	24. $\int_2^5 \frac{x^3 + 5}{\sqrt{x-2}} dx$

Вариант 9

1. $\int \frac{dx}{\sqrt[3]{\ln x}\cdot x}$	2. $\int \sin 3x \sin 5x\, dx$
3. $\int \arcsin(2x)\, dx$	4. $\int \frac{3x^2-15}{x^2-7x-8} dx$
5. $\int \frac{9x-9}{(x-3)^2(x+3)} dx$	6. $\int \frac{29-2x^2}{(x+1)(x^2+2x+10)} dx$
7. $\int \frac{\cos x+2}{3\cos x-5} dx$	8. $\int \sin^4 3x \cos^4 3x\, dx$
9. $\int \sqrt{\frac{x-1}{x+1}} dx$	10. $\int x^2\sqrt{1-x^2}\, dx$
11. $\int_1^2 x^2 e^{3x}\, dx$	12. $\int_0^{\frac{\pi}{2}} \frac{\cos x\, dx}{2+\cos x}$
13. $D: \frac{x^2}{4}+\frac{y^2}{9}=1$	14. $D: \begin{cases} x=9\cos t, & y=2, \\ y=4\sin t, & (y\ge 2) \end{cases}$
15. $D: \rho=2\varphi,\ 0\le\varphi\le 1$	16. $L: y=\sqrt{1-x^2}+\arccos x;$ $0\le x\le 0{,}9$
17. $L: \begin{cases} x=2t, \\ y=e^{2t}, \end{cases} 0\le t\le 1$	18. $L: \rho=1-\cos\varphi;\ 0\le\varphi\le\frac{\pi}{2}$
19. $V: z=4x^2+9y^2,$ $z=2$	20. $y=2\sin x;\ 0\le x\le\pi$ $(0x)$
21. $\int_3^{+\infty} \frac{dx}{x^2-6x+10}$	22. $\int_1^{+\infty} \frac{\sqrt{x+1}}{x+7} dx$
23. $\int_4^6 \frac{4x}{\sqrt{x^2-16}} dx$	24. $\int_1^5 \frac{x+e^x}{(x-1)^2} dx$

Вариант 10

1. $\int \frac{x\,dx}{(x^2+1)^2}$	2. $\int \cos 3x \cos x\,dx$
3. $\int (2-x-x^2)\cos(5x)\,dx$	4. $\int \frac{2x^2+10x+14}{x^2+6x+8}dx$
5. $\int \frac{6x^2-2x^3+x+3}{x^3(x+3)}dx$	6. $\int \frac{3x^2-8x+23}{(x-1)(x^2-2x+10)}dx$
7. $\int \frac{1-\sin x}{10+8\sin x}dx$	8. $\int \cos^4 x\,dx$
9. $\int \frac{x+\sqrt[3]{x}}{\sqrt[6]{x}+1}dx$	10. $\int \frac{x^2}{\left(\sqrt{16-x^2}\right)^3}dx$
11. $\int_{\frac{1}{2}}^{1} e^{2x}\sin x\,dx$	12. $\int_{2\operatorname{arctg}2}^{2\operatorname{arctg}3} \frac{dx}{\cos x(1-\cos x)}$
13. $D: y=\arcsin x,\ y=0,$ $0\le x\le 1$	14. $D: \begin{cases} x=32\cos^3 t, & x=12\sqrt{3}, \\ y=3\sin^3 t, & (x\ge 12\sqrt{3}) \end{cases}$
15. $D: \rho=5\cos\varphi,$ $0\le\varphi\le\frac{\pi}{3}$	16. $L: y=\ln(1-x^2);$ $0\le x\le 0{,}5$
17. $L: \begin{cases} x=2t, \\ y=\operatorname{ch}2t, \end{cases} 0\le t\le 2$	18. $L: \rho=1+\sin\varphi;\ \frac{\pi}{6}\le\varphi\le\frac{\pi}{3}$
19. $V: \frac{x^2}{4}+y^2-z^2=4,$ $z=1,\ z=2$	20. $y=5\cos x;\ 0\le x\le\frac{\pi}{2}$ $(0x)$
21. $\int_{6}^{+\infty} \frac{dx}{x^2-6x+8}$	22. $\int_{1}^{+\infty} \frac{\sqrt{x^3}+5}{x^4+x+1}dx$
23. $\int_{4}^{5} \frac{4}{\sqrt{x^2-16}}dx$	24. $\int_{0}^{1} \frac{x+5}{\sqrt{1-x^4}}dx$

Вариант 11

1. $\int \frac{dx}{x\cdot(\ln^2 x-4)}$	2. $\int \sin 2x \cos x\, dx$
3. $\int \left(x^2-4x+3\right)e^{2x}\, dx$	4. $\int \frac{x^2-11}{x^2-2x-3}dx$
5. $\int \frac{6x^2+15x-5}{(x+3)^2(x-1)}dx$	6. $\int \frac{3x^2+9x+5}{(x+3)\left(x^2+2x+2\right)}dx$
7. $\int \frac{dx}{6\sin x+10}$	8. $\int \sin^4\frac{x}{2}\cos^4\frac{x}{2}dx$
9. $\int \sqrt{\frac{x+5}{x-3}}dx$	10. $\int \sqrt{9-x^2}\, dx$
11. $\int\limits_{\frac{\pi}{6}}^{\frac{\pi}{4}} e^x \cos x\, dx$	12. $\int\limits_{2\operatorname{arctg}\frac{1}{2}}^{\frac{\pi}{2}} \frac{dx}{(1+\sin x-\cos x)^2}$
13. $D: y=\operatorname{tg} x,\ y=\frac{2}{3}\cos x,\ x=0$	14. $D:\begin{cases} x=t^2, \\ y=t^3-t \end{cases}$
15. $D: \rho=3\sin\varphi,\ 0\le\varphi\le\frac{\pi}{2}$	16. $L: y=\operatorname{ch}x;\ 0\le x\le 2$
17. $L:\begin{cases} x=2t, \\ y=\ln(\cos 2t), \end{cases} 0\le t\le\frac{\pi}{6}$	18. $L: \rho=2\varphi;\ 0\le\varphi\le\frac{1}{2}$
19. $V: x^2+\frac{y^2}{16}-\frac{z^2}{4}=1,\ z=3$	20. $y=\sin^2 x;\ 0\le x\le\pi\ \ (0x)$
21. $\int\limits_{-\infty}^{0} \frac{dx}{x^2+2x+2}$	22. $\int\limits_{1}^{+\infty} \frac{4+\cos x}{\sqrt[3]{x^2+3}}dx$
23. $\int\limits_{2}^{3} \frac{x}{\sqrt[3]{x-2}}dx$	24. $\int\limits_{-1}^{2} \frac{5-\sin x}{\sqrt{(x+1)^3}}dx$

Вариант 12

1. $\int \frac{\operatorname{tg}^5 x}{\cos^2 x}\,dx$	2. $\int \sin 4x \cos x\,dx$
3. $\int \ln\left(1-x^2\right)dx$	4. $\int \frac{x^3+3x^2+5x+6}{x^2+3x}\,dx$
5. $\int \frac{2x^3-16x^2+x-4}{x^3(x-4)}\,dx$	6. $\int \frac{5x^2-5x+10}{(x-3)(x^2+2x+5)}\,dx$
7. $\int \frac{dx}{\cos x+5\sin x+1}$	8. $\int \sin^2 x \cos^4 x\,dx$
9. $\int \frac{2dx}{\sqrt{2x+3}+2}$	10. $\int \frac{dx}{x^2\sqrt{x^2-25}}$
11. $\int_1^2 e^x \sin 2x\,dx$	12. $\int_0^{\frac{2\pi}{3}} \frac{(1+\sin x)dx}{1+\cos x+\sin x}$
13. $D: x^2+\frac{y^2}{4}=1$	14. $D:\begin{cases} x=2+\cos t, \\ y=3+\sin t \end{cases}$
15. $D: \rho=2\sin\varphi,\ \frac{\pi}{6}\le\varphi\le\frac{\pi}{2}$	16. $L: y=3-\ln\cos x;$ $0\le x\le\frac{\pi}{3}$
17. $L:\begin{cases} x=2t, \\ y=\ln(\sin 2t), \end{cases} \frac{\pi}{6}\le t\le\frac{\pi}{3}$	18. $L: \rho=\cos\varphi;\ 0\le\varphi\le\frac{\pi}{2}$
19. $V: \frac{x^2}{16}+\frac{y^2}{9}+\frac{z^2}{4}=1,$ $z=0,\ z=1$	20. $y=x^3+2;\ 0\le x\le 1\ \ (0x)$
21. $\int_{-\infty}^{-3} \frac{dx}{x^2+2x}$	22. $\int_1^{+\infty} \frac{\operatorname{arctg} x}{e^x}\,dx$
23. $\int_0^2 \frac{2x^2}{\sqrt[3]{8-x^3}}dx$	24. $\int_2^3 \frac{4+\cos x}{\sqrt[3]{x-2}}\,dx$

Вариант 13

1. $\int x^{10}\sqrt{3x^{11}+2}\,dx$	2. $\int \cos 2x \cos 7x\,dx$
3. $\int (2x-x^2)\sin(3x)\,dx$	4. $\int \frac{3x^2-18}{x^2-2x-8}\,dx$
5. $\int \frac{5x^2-14x+2}{(x-3)^2(x+2)}\,dx$	6. $\int \frac{-2x^2-10x-3}{(x+1)(x^2-2x+2)}\,dx$
7. $\int \frac{dx}{\sin x+2\cos x-3}$	8. $\int \sin^4 6x\,dx$
9. $\int \sqrt{\frac{x-3}{x+4}}\,dx$	10. $\int \frac{x^4 dx}{\left(\sqrt{1-x^2}\right)^3}$
11. $\int_2^3 \cos(\ln x)\,dx$	12. $\int_0^{\frac{\pi}{2}} \frac{(1+\cos x)dx}{1+\cos x+\sin x}$
13. $D: y=\sin x,\ y=\cos x,\ y=0$	14. $D:\begin{cases} x=\frac{9}{5}\cos^3 t, \\ y=\frac{9}{4}\sin^3 t \end{cases}$
15. $D: \rho=\frac{1}{2\varphi},\ \frac{\pi}{3}\le\varphi\le\frac{2\pi}{3}$	16. $L: y=(e^{2x}+e^{-2x})/4+5;\ 0\le x\le 1$
17. $L:\begin{cases} x=2t, \\ y=2\ln(t^3-1), \end{cases} 2\le t\le 3$	18. $L: \rho=\sin\varphi;\ 0\le\varphi\le\frac{\pi}{3}$
19. $V: \frac{x^2}{3}+\frac{y^2}{12}=1,$ $z=0,\ z=y\sqrt{3}\ \ (y\ge 0)$	20. $y=\sqrt{x}e^x;\ 0\le x\le 1\ \ (0x)$
21. $\int_{-\infty}^0 \frac{dx}{x^2+4x+8}$	22. $\int_1^{+\infty} \frac{x^2+3x+1}{\sqrt[3]{x^7+4x+2}}\,dx$
23. $\int_5^6 \frac{5x}{\sqrt{x^2-25}}dx$	24. $\int_0^1 \frac{dx}{\sqrt{x}-1}$

Вариант 14

1. $\int \frac{e^{\operatorname{arctg} x}dx}{1+x^2}$	2. $\int \sin x \sin 9x\, dx$
3. $\int (3x^2+x-5)e^x\, dx$	4. $\int \frac{3x^3+6x^2-3x-4}{x^2+2x}dx$
5. $\int \frac{2x^3+6x^2+2x+4}{x^3(x+2)}dx$	6. $\int \frac{x^2-6x+13}{(x-1)(x^2-2x+5)}dx$
7. $\int \frac{\cos x\, dx}{15+5\cos x}$	8. $\int \sin^4 2x \cos^4 2x\, dx$
9. $\int \frac{(x-1)dx}{3-\sqrt{x+3}}$	10. $\int \frac{\sqrt{x^2-9}}{x^4}dx$
11. $\int_2^3 \sin(\ln x)dx$	12. $\int_0^{2\operatorname{arctg}\frac{1}{2}} \frac{(1+\sin x)dx}{(1-\sin x)^2}$
13. $D: y=\ln x,\ y=\ln^2 x$	14. $D: \begin{cases} x=2\sqrt{2}\cos^3 t,\ x=1, \\ y=\sqrt{2}\sin^3 t,\ (x\ge 1) \end{cases}$
15. $D: \rho=\operatorname{ctg}\varphi,\ \frac{\pi}{6}\le\varphi\le\frac{\pi}{3}$	16. $L: y=-\arccos\sqrt{x}+\sqrt{x-x^2}$; $0\le x\le 0{,}5$
17. $L: \begin{cases} x=3t, \\ y=3\ln(1-t^2), \end{cases} \frac{1}{3}\le t\le\frac{1}{2}$	18. $L: \rho=2e^{\frac{5\varphi}{12}};\ 0\le\varphi\le 1$
19. $V: z=x^2+6y^2,\ z=2$	20. $y=4-x^2;\ 0\le x\le 2$ $(0x)$
21. $\int_{-\infty}^{-5} \frac{dx}{x^2+4x}$	22. $\int_1^{+\infty} \frac{1+\sin x}{\sqrt{x^3+7}}dx$
23. $\int_5^6 \frac{3}{\sqrt{x^2-25}}dx$	24. $\int_0^1 \frac{\arcsin x}{\sqrt[4]{1-x}}dx$

Вариант 15

1. $\int \frac{x\,dx}{\sqrt{x^2+1}}$	2. $\int \sin 4x \cos 3x\,dx$
3. $\int \operatorname{arctg}(4x)\,dx$	4. $\int \frac{4x^2+2}{x^2-2x-8}\,dx$
5. $\int \frac{5x^2+7x}{(x+2)^2(x-4)}\,dx$	6. $\int \frac{3x^2+12x+13}{(x+3)(x^2+4x+5)}\,dx$
7. $\int \frac{dx}{3-2\sin x+\cos x}$	8. $\int \cos^4 3x\,dx$
9. $\int \frac{\sqrt{x}+x}{1+\sqrt[3]{x}}\,dx$	10. $\int \frac{x^4}{\sqrt{16-x^2}}\,dx$
11. $\int\limits_{\frac{\pi}{6}}^{\frac{\pi}{4}} \frac{x\cos x}{\sin^2 x}\,dx$	12. $\int\limits_0^{2\operatorname{arctg}\frac{1}{3}} \frac{\cos x\,dx}{(1+\cos x)(1-\sin x)}$
13. $D: y=2x^2,\ y=-x^3$	14. $D: \begin{cases} x=3\cos t, \\ y=8\sin t \end{cases}$
15. $D: \rho=ch\varphi,\ 0\le\varphi\le 1$	16. $L: y=(e^{2x}+e^{-2x})/4-3;$ $\ln\sqrt{2}\le x\le\ln\sqrt{5}$
17. $L: \begin{cases} x=4(t-\sin t), \\ y=4(1-\cos t), \end{cases} 0\le t\le\frac{\pi}{2}$	18. $L: \rho=5\varphi;\ 0\le\varphi\le 1$
19. $V: \frac{x^2}{49}+\frac{y^2}{25}-z^2=1,$ $z=0,\ z=3$	20. $y=e^{2-x};\ 0\le x\le 1\ \ (0x)$
21. $\int\limits_{-\infty}^{0} \frac{dx}{x^2-2x+2}$	22. $\int\limits_1^{+\infty} \frac{dx}{\sqrt{x}+\sin^2 x}$
23. $\int\limits_3^4 \frac{x}{\sqrt[3]{x-3}}dx$	24. $\int\limits_2^4 \frac{x^3+1}{(x-2)^2}\,dx$

Вариант 16

1. $\int \frac{4-\operatorname{ctg}^3 x}{\sin^2 x}\,dx$	2. $\int \cos x \cos 8x\,dx$
3. $\int \left(9-x^2\right)\cos(2x)\,dx$	4. $\int \frac{3x^2+6x-1}{x^2+2x-3}\,dx$
5. $\int \frac{6x^3+20x^2-x-5}{x^3(x+5)}\,dx$	6. $\int \frac{9x+2}{(x-3)\left(x^2+4x+8\right)}\,dx$
7. $\int \frac{dx}{3\sin x+2\cos x-5}$	8. $\int \sin^2\frac{x}{4}\cos^4\frac{x}{4}\,dx$
9. $\int \sqrt{\frac{x-6}{x+2}}\,dx$	10. $\int x^2\sqrt{4-x^2}\,dx$
11. $\int_1^4 x^2 e^{-x}\,dx$	12. $\int_{-\frac{2\pi}{3}}^{0} \frac{\cos x\,dx}{1+\cos x-\sin x}$
13. $D: y=\ln x,\ y=0,\ x=e,\ x=e^2$	14. $D:\begin{cases} x=6(t-\sin t), \\ y=6(1-\cos t), \end{cases}$ $y=6\ (0<x<12\pi, y\ge 6)$
15. $D: \rho=\operatorname{sh}\varphi,\ 0\le\varphi\le\frac{\pi}{2}$	16. $L: y=\arcsin x-\sqrt{1-x^2}$; $0\le x\le 1$
17. $L:\begin{cases} x=2\cos^3 t, \\ y=2\sin^3 t, \end{cases} \frac{\pi}{2}\le t\le\pi$	18. $L: \rho=e^{\frac{12}{5}\varphi};\ 0\le\varphi\le 1$
19. $V: \frac{x^2}{4}+\frac{y^2}{9}-\frac{z^2}{25}=-1,$ $z=6, z>0$	20. $y=\sqrt{3-x}$; $1\le x\le 3$ $(0x)$
21. $\int_{-\infty}^{-2} \frac{dx}{x^2-2x}$	22. $\int_1^{+\infty} \frac{dx}{x^2+\cos^2 x}$
23. $\int_1^3 \frac{3x}{\sqrt[3]{9-x^2}}dx$	24. $\int_2^3 \frac{e^x}{\sqrt[3]{x^3-8}}dx$

Вариант 17

1. $\int \frac{dx}{x \ln^5 x}$	2. $\int \sin 5x \sin 6x \, dx$
3. $\int (3 - x^2) \sin(3x) \, dx$	4. $\int \frac{4x^2 + 11}{x^2 + 7x + 10} dx$
5. $\int \frac{6x - 2}{(x+1)^2 (x-3)} dx$	6. $\int \frac{4x^2 + 3x + 7}{(x+2)(x^2 + 5 - 4x)} dx$
7. $\int \frac{dx}{8\cos x + 4\sin x + 9}$	8. $\int \sin^4 \frac{x}{4} \, dx$
9. $\int \frac{\sqrt{x+1} + 1}{2 - \sqrt{x+1}} dx$	10. $\int \frac{dx}{\left(\sqrt{x^2 + 25}\right)^3}$
11. $\int_0^{\frac{1}{2}} (\arcsin x)^2 \, dx$	12. $\int_0^{\frac{\pi}{2}} \frac{\cos x \, dx}{(1 + \cos x + \sin x)^2}$
13. $D: y = (x^2 + 2x) e^{-x}$, $y = 0$	14. $D: \begin{cases} x = 5 + \sin t, \\ y = 4 + \cos t \end{cases}$
15. $D: \rho = 4\sqrt{\varphi}$, $0 \le \varphi \le 1$	16. $L: y = 2 - \ln \sin x$; $\frac{\pi}{6} \le x \le \frac{\pi}{3}$
17. $L: \begin{cases} x = 6\cos t + 3\cos 2t, \\ y = 6\sin t - 3\sin 2t, \end{cases} \frac{\pi}{2} \le t \le \pi$	18. $L: \rho = \frac{2}{\varphi}$; $1 \le \varphi \le 2$
19. $V: \frac{x^2}{16} + y^2 + \frac{z^2}{9} = 1$, $z = 0$, $z = 2$	20. $y = 2x^3 - 1$; $1 \le x \le 2$ $(0x)$
21. $\int_{-\infty}^{0} \frac{dx}{x^2 - 4x + 8}$	22. $\int_1^{+\infty} \frac{x + 6}{\sqrt[3]{x^4} + x + 8} dx$
23. $\int_0^1 \frac{x}{\sqrt{1 - x^2}} dx$	24. $\int_7^8 \frac{e^x + 5}{(x-7)^3} dx$

Вариант 18

1. $\int \frac{x^2 dx}{\sqrt{2x^3+3}}$	2. $\int \sin 2x \sin 6x \, dx$
3. $\int \left(x^2+5x+7\right)e^{2x} \, dx$	4. $\int \frac{4x^3+16x^2-x-12}{x^2+4x} dx$
5. $\int \frac{2x-9x^2-2x^3+6}{x^3(x+3)} dx$	6. $\int \frac{3x^2-8x+8}{(x-2)(x^2-4x+8)} dx$
7. $\int \frac{dx}{3\cos x - 4\sin x + 5}$	8. $\int \sin^4 x \cos^4 x \, dx$
9. $\int \sqrt{\frac{x-3}{x+1}} dx$	10. $\int \frac{dx}{x^2\sqrt{x^2-1}}$
11. $\int_0^1 (\operatorname{arctg} x)^2 dx$	12. $\int_0^{\frac{\pi}{2}} \frac{\sin x \, dx}{(1+\sin x)^2}$
13. $D: y = e^x$, $y = e^{-x}$, $x = 1$	14. $D: \begin{cases} x = 6(t-\sin t), \\ y = 6(1-\cos t), \end{cases} y = 9,$ $(y \ge 9, 0 < x < 12\pi)$
15. $D: \rho = 4\sin\varphi$, $0 \le \varphi \le \frac{\pi}{3}$	16. $L: y = 3 - \ln(x^2-1)$; $\sqrt{2} \le x \le 3$
17. $L: \begin{cases} x = 3\cos t + 3t\sin t, \\ y = 3\sin t - 3t\cos t, \end{cases} 1 \le t \le 2$	18. $L: \rho = 3e^{\frac{7\varphi}{24}}$; $0 \le \varphi \le 1$
19. $V: \frac{x^2}{2} + \frac{y^2}{8} = 1$, $z = 0$, $z = y\sqrt{3}$ $(y \ge 0)$	20. $y = \arccos\frac{x}{3}$; $x \ge 0$ $(0y)$
21. $\int_{-\infty}^{-1} \frac{dx}{x^2-4x}$	22. $\int_1^{+\infty} \frac{x+15}{8x^3+4x+11} dx$
23. $\int_0^1 \frac{1}{\sqrt{1-x^2}} dx$	24. $\int_0^1 \frac{\cos^2 x}{\sqrt{x}} dx$

Вариант 19

1. $\int \frac{\cos x\,dx}{\sqrt{\sin^2 x+2}}$	2. $\int \cos 3x \cos 5x\,dx$
3. $\int \ln\left(4x^2-1\right)dx$	4. $\int \frac{x^2+11}{x^2+x-2}dx$
5. $\int \frac{18-x^2-x}{(x-2)^2(x+2)}dx$	6. $\int \frac{2x^2-x+18}{(x+3)\left(x^2+2x+10\right)}dx$
7. $\int \frac{dx}{2\cos x+5\sin x-1}$	8. $\int \sin^4 x \cos^4 x\ dx$
9. $\int \frac{2\sqrt{x+2}-1}{5+\sqrt{x+2}}dx$	10. $\int \sqrt{25-x^2}dx$
11. $\int\limits_0^{\pi/2} x\cos x\,dx$	12. $\int\limits_{-\frac{\pi}{2}}^{0} \frac{\sin x\,dx}{(1+\cos x-\sin x)^2}$
13. $D: \frac{x^2}{16}+\frac{y^2}{4}=1$	14. $D: \begin{cases} x=8\cos^3 t,\ x=3\sqrt{3}, \\ y=4\sin^3 t,\ \left(x\ge 3\sqrt{3}\right) \end{cases}$
15. $D: \rho=5\cos 4\varphi,$ $-\frac{\pi}{8}\le\varphi\le\frac{\pi}{8}$	16. $L: y=\sqrt{x-x^2}-\arccos\sqrt{x}+3;$ $\frac{1}{4}\le x\le 1$
17. $L: \begin{cases} x=2\cos t-\cos 2t, \\ y=2\sin t-\sin 2t,\ 0\le t\le\frac{\pi}{4} \end{cases}$	18. $L: \rho=2(1+\cos\varphi);$ $\frac{\pi}{2}\le\varphi\le\pi$
19. $V: z=x^2+5y^2,\ z=2$	20. $y=\arcsin\frac{x}{5};\ x\ge 0 \quad (0y)$
21. $\int\limits_{-\infty}^{2} \frac{dx}{x^2-6x+10}$	22. $\int\limits_{1}^{+\infty} \frac{x+1}{\sqrt[3]{x^5+x^3+5}}dx$
23. $\int\limits_{4}^{5} \frac{x}{\sqrt[3]{x-4}}dx$	24. $\int\limits_{3}^{5} \frac{\sin x+3}{(x-5)^4}dx$

Вариант 20

1. $\int \frac{x^2 dx}{x^6+1}$	2. $\int \sin 4x \cos x \, dx$
3. $\int (2-x-x^2)\cos(5x)\,dx$	4. $\int \frac{3x^3-9x^2+4x-15}{x^2-3x} dx$
5. $\int \frac{3x-10x^2-x^3+15}{x^3(x+5)} dx$	6. $\int \frac{3x^2-7x+20}{(x-3)(x^2-2x+10)} dx$
7. $\int \frac{2\sin x \, dx}{12\sin x - 13}$	8. $\int \sin^4 3x \, dx$
9. $\int \frac{\sqrt[3]{x}+x}{\sqrt{x}+\sqrt[6]{x}} dx$	10. $\int \frac{x^2 dx}{\left(\sqrt{4-x^2}\right)^3} dx$
11. $\int_1^2 \frac{\ln x}{x^2} dx$	12. $\int_0^{\frac{\pi}{2}} \frac{\sin x \, dx}{2+\sin x}$
13. $D: y=e^x,\ y=-x^3e^x,\ x=0$ $x=-1$	14. $D: \begin{cases} x=3\cos t, & y=4, \\ y=8\sin t, & (y \ge 4) \end{cases}$
15. $D: \rho = 4(2+\cos\varphi),$ $0 \le \varphi \le \pi$	16. $L: y = 3 - \arccos x + \sqrt{1-x^2}$; $0 \le x \le 4/9$
17. $L: \begin{cases} x=3(t^2-2)\sin t + 6t\cos t, \\ y=3(2-t^2)\cos t + 6t\sin t, \end{cases}$ $0 \le t \le \frac{\pi}{2}$	18. $L: \rho = 4\sin^3\frac{\varphi}{3}$; $\frac{\pi}{2} \le \varphi \le \pi$
19. $V: \frac{x^2}{9}+\frac{y^2}{4}-z^2=1,\ z=1,$ $z=3$	20. $y=x^2;\ 0 \le y \le 1\ \ (0y)$
21. $\int_{-\infty}^{1} \frac{dx}{x^2-6x+8}$	22. $\int_1^{+\infty} \frac{\operatorname{arctg} x \, dx}{x\sqrt{x}+7}$
23. $\int_0^3 \frac{4x^2}{\sqrt[3]{27-x^3}} dx$	24. $\int_1^2 \frac{x+7}{\sqrt{2-x}} dx$

Вариант 21

1. $\int \frac{e^{\frac{1}{x}}\,dx}{x^2}$	2. $\int \cos 5x \cos 2x\,dx$
3. $\int \operatorname{arctg}(2x)\,dx$	4. $\int \frac{8x^2-7}{x^2-x-2}dx$
5. $\int \frac{2-x^2-x}{(x+2)^2(x+1)}dx$	6. $\int \frac{2x^2+9x+14}{(x+4)(x^2+2x+2)}dx$
7. $\int \frac{dx}{8\sin x+\cos x-10}$	8. $\int \sin^2\frac{3x}{2}\cos^4\frac{3x}{2}\,dx$
9. $\int \sqrt{\frac{x-3}{x+2}}\,dx$	10. $\int x^2\sqrt{9-x^2}\,dx$
11. $\int_0^1 \frac{\sin 2x}{2^x}dx$	12. $\int_0^{\frac{\pi}{3}} \frac{dx}{\cos x(1+\cos x)}$
13. $D: y=x^2-x^3,\ y=0$	14. $D: \begin{cases} x=8(t-\sin t), \\ y=8(1-\cos t), \end{cases} y=12,$ $(y\ge 12,\ 0<x<16\pi)$
15. $D: \rho=2\operatorname{tg}2\varphi,$ $-\frac{\pi}{8}\le\varphi\le\frac{\pi}{8}$	16. $L: y=2+\ln\sin x;$ $\frac{\pi}{4}\le x\le\frac{\pi}{3}$
17. $L: \begin{cases} x=7(t-\sin t), \\ y=7(1-\cos t), \end{cases} \frac{\pi}{2}\le t\le\pi$	18. $L: \rho=\sin^3\frac{\varphi}{3};\ 0\le\varphi\le\frac{\pi}{2}$
19. $V: \frac{x^2}{9}+\frac{y^2}{25}-\frac{z^2}{64}=-1,$ $z=10$	20. $y=\sqrt{x-1};\ 0\le y\le 1\ \ (0y)$
21. $\int_{-3}^{+\infty} \frac{dx}{x^2+8x+17}$	22. $\int_1^{+\infty} \frac{9+\cos x}{\sqrt{x}+9}dx$
23. $\int_1^2 \frac{2x}{\sqrt{4-x^2}}dx$	24. $\int_7^8 \frac{\sin^2 x}{\sqrt[5]{(x-7)^6}}dx$

Вариант 22

1. $\int \frac{x^8\,dx}{x^9+2}$	2. $\int \sin 6x \sin x\,dx$
3. $\int \left(3x^2+4\right)e^{4x}\,dx$	4. $\int \frac{5x^2-6x-1}{x^2-x}dx$
5. $\int \frac{6x^2-x^3+4x-12}{x^3(x-3)}dx$	6. $\int \frac{5x^2-10x+18}{(x-4)(x^2+2x+5)}dx$
7. $\int \frac{dx}{2+3\cos x-2\sin x}$	8. $\int \sin^2 5x \cos^2 5x\,dx$
9. $\int \frac{1-\sqrt{2x+1}}{\sqrt{2x+1}+3}dx$	10. $\int \frac{x^4}{\sqrt{1-x^2}}dx$
11. $\int_1^e \ln^2 x\,dx$	12. $\int_{-\frac{\pi}{2}}^{0} \frac{\cos x\,dx}{(1+\cos x-\sin x)^2}$
13. $D: y=(x-1)^2,\ y^2=x-1$	14. $D: \begin{cases} x=8\cos^3 t, & x=3\sqrt{3}, \\ y=4\sin^3 t, & (x\ge 3\sqrt{3}) \end{cases}$
15. $D: \rho=2-\sin\varphi,\ 0\le\varphi\le\frac{\pi}{2}$	16. $L: y=\ln 3-\ln x;$ $\sqrt{5}\le x\le 3$
17. $L: \begin{cases} x=3e^t(\cos t+\sin t), \\ y=3e^t(\cos t-\sin t), 0\le t\le\frac{\pi}{2} \end{cases}$	18. $L: \rho=4(1+\sin\varphi);$ $\frac{\pi}{2}\le\varphi\le\pi$
19. $V: x^2+\frac{y^2}{9}+\frac{z^2}{25}=1, z=1, z=4$	20. $y=\ln x;\ 1\le x\le e \quad (0y)$
21. $\int_2^{+\infty} \frac{dx}{x^2+8x}$	22. $\int_1^{+\infty} \frac{3-\sin x}{x^4+5x+6}dx$
23. $\int_1^2 \frac{1}{\sqrt{4-x^2}}dx$	24. $\int_1^2 \frac{\cos^2 x\,dx}{\sqrt{4-x^2}}dx$

Вариант 23

1. $\int \frac{\ln^2 x + \ln x + 1}{x} dx$	2. $\int \sin 8x \cos 3x \, dx$
3. $\int (1 - x^2) \sin(2x) \, dx$	4. $\int \frac{x^2 + 19}{10 - x^2 - 3x} dx$
5. $\int \frac{3x - 2x^2 + 30}{(x-4)^2 (x+1)} dx$	6. $\int \frac{x^2 - 11x - 8}{(x+4)(x^2 - 2x + 2)} dx$
7. $\int \frac{1 - \cos x}{\cos x + 3} dx$	8. $\int \cos^4 2x \ dx$
9. $\int \sqrt{\frac{x+4}{x-2}} dx$	10. $\int \frac{dx}{x^2 \sqrt{x^2 - 9}}$
11. $\int_0^1 x^3 e^{x^2} dx$	12. $\int_0^{2\operatorname{arctg}\frac{1}{2}} \frac{(1 - \sin x) dx}{\cos x (1 + \cos x)}$
13. $D: \frac{x^2}{9} + \frac{y^2}{25} = 1$	14. $D: \begin{cases} x = 2 + 3\cos t, \\ y = 3 + 2\sin t \end{cases}$
15. $D: \rho = 2(1 + \sin \varphi)$, $-\frac{\pi}{2} \le \varphi \le \frac{\pi}{2}$	16. $L: y = \frac{1}{2} \operatorname{ch} 2x + 1$; $0 \le x \le 0{,}5$
17. $L: \begin{cases} x = 4t, \\ y = 2e^{2t}, 1 \le t \le 2 \end{cases}$	18. $L: \rho = 2(1 - \sin \varphi)$; $\frac{\pi}{3} \le \varphi \le \frac{2\pi}{3}$
19. $V: \frac{x^2}{12} + \frac{y^2}{27} = 1$, $z = 0$, $z = \frac{y}{\sqrt{3}} (y \ge 0)$	20. $y = \arccos \frac{x}{5}$; $x \le 0$ $(0y)$
21. $\int_{-2}^{+\infty} \frac{dx}{x^2 + 8x + 20}$	22. $\int_1^{+\infty} \frac{13 + \sin x}{\sqrt[3]{x^2} + \sqrt{x} + 1} dx$
23. $\int_5^6 \frac{x}{\sqrt[3]{x - 5}} dx$	24. $\int_1^3 \frac{x^2 + 1}{\sqrt{(x-1)^5}} dx$

Вариант 24

1. $\int \frac{\sin x\,dx}{\cos^2 x}$	2. $\int \sin x \cos 5x\,dx$
3. $\int \left(x^2+8x+2\right)\cos(3x)\,dx$	4. $\int \frac{3x^2-4x-8}{x^2-2x}dx$
5. $\int \frac{x^3-x^2+5x+5}{x^3(x+1)}dx$	6. $\int \frac{13x-3x^2+9}{(x-4)\left(x^2-2x+5\right)}dx$
7. $\int \frac{dx}{5-4\cos x+2\sin x}$	8. $\int \sin^4 4x \cos^4 4x\ dx$
9. $\int \frac{2x-1}{3+\sqrt{x-3}}dx$	10. $\int \sqrt{16-x^2}dx$
11. $\int\limits_0^{\frac{1}{4}} \frac{\arcsin 2x\,dx}{\sqrt{1-4x^2}}$	12. $\int\limits_0^{\frac{\pi}{2}} \frac{\sin x\,dx}{(1+\sin x+\cos x)^2}$
13. $D: y=x(x-1)^2,\ y=0$	14. $D: \begin{cases} x=5\cos t, \\ y=\sin t \end{cases}$
15. $D: \rho=2(1-\cos\varphi),\ -\frac{\pi}{2}\le\varphi\le 0$	16. $L: y=4+\arcsin x-\sqrt{1-x^2};\ 0\le x\le\frac{5}{6}$
17. $L: \begin{cases} x=6t, \\ y=3\mathrm{ch}2t,\ 0\le t\le 1 \end{cases}$	18. $L: \rho=3\varphi;\ 1\le\varphi\le 3$
19. $V: z=4x^2+8y^2,\ z=5$	20. $y=\arcsin\frac{x}{2};\ x\le 0,\ (0y)$
21. $\int\limits_2^{+\infty} \frac{dx}{x^2+8x+12}$	22. $\int\limits_1^{+\infty} \frac{\cos\left(\frac{1}{x}\right)}{x^3+x+16}dx$
23. $\int\limits_5^6 \frac{x}{\sqrt[3]{25-x^2}}dx$	24. $\int\limits_3^7 \frac{x^2+2}{\sqrt{x-3}}dx$

Вариант 25

1. $\int \frac{dx}{\sqrt[3]{x^2}\left(\sqrt[3]{x}+3\right)}$	2. $\int \cos 4x \cos 6x\, dx$
3. $\int \arcsin(3x)\, dx$	4. $\int \frac{x^2+5}{x^2-5x+4} dx$
5. $\int \frac{5x-x^2+12}{(x+3)^2(x-1)} dx$	6. $\int \frac{5x^2+23x+10}{(x+5)(x^2+4x+5)} dx$
7. $\int \frac{2\sin x-3}{5-4\sin x} dx$	8. $\int \sin^4 \frac{x}{2} \cos^2 \frac{x}{2}\, dx$
9. $\int \frac{\sqrt{x+4}}{x} dx$	10. $\int \frac{dx}{(\sqrt{25+x^2})^3}$
11. $\int_0^{\frac{\pi}{4}} x \sin x \cos x\, dx$	12. $\int_0^{\frac{\pi}{2}} \frac{dx}{3+2\cos x}$
13. $D: y=\frac{1}{1+x^2},\ y=\frac{x^2}{2}$	14. $D: \begin{cases} x=10(t-\sin t), \\ y=10(1-\cos t), \end{cases}$ $y=15\ (0<x<20\pi,\ y\ge 15)$
15. $D: \rho=a\varphi,\ 0\le\varphi\le 2$	16. $L: y=6+\ln\cos x;$ $0\le x\le\frac{\pi}{3}$
17. $L: \begin{cases} x=6t, \\ y=3\ln(\cos 2t), \end{cases} -\frac{\pi}{6}\le t\le\frac{\pi}{6}$	18. $L: \rho=3\cos\varphi; -\frac{\pi}{2}\le\varphi\le 0$
19. $V: x^2+\frac{y^2}{25}-z^2=1,\ z=5$	20. $y=\sqrt[4]{x};\ x\le 1 \quad (0y)$
21. $\int_3^{+\infty} \frac{dx}{x^2-8x+17}$	22. $\int_1^{+\infty} \frac{x^2+2\sqrt{x}+6}{x^3+x\sqrt{x}+1} dx$
23. $\int_2^3 \frac{3x}{\sqrt{9-x^2}} dx$	24. $\int_3^4 \frac{e^x+x^2}{(x-3)^2} dx$

Вариант 26

1. $\int \frac{dx}{\arcsin x\sqrt{1-x^2}}$	2. $\int \sin 5x \cos x\,dx$
3. $\int (x^2+2)\sin(5x)\,dx$	4. $\int \frac{2x^3-6x^2+4x-15}{x^2-3x}dx$
5. $\int \frac{4x-x^2-3x^3+4}{x^3(x+1)}dx$	6. $\int \frac{8x+13}{(x-5)(x^2+4x+8)}dx$
7. $\int \frac{dx}{2-\sin x+5\cos x}$	8. $\int \sin^2 3x \cos^4 3x\ dx$
9. $\int \sqrt{\frac{x+5}{x-6}}dx$	10. $\int x^2\sqrt{25-x^2}\,dx$
11. $\int_{-1}^{1} x\,\mathrm{arctg}\,x\,dx$	12. $\int_0^{\frac{\pi}{2}} \frac{\sin x\,dx}{3+\cos x}$
13. $D: y=(x-2)^3,\ y=4x-8$	14. $D: \begin{cases} x=\cos^3 t, \\ y=\sin^3 t \end{cases}$
15. $D: \rho=5\cos\varphi,\ -\frac{\pi}{2}\le\varphi\le\frac{\pi}{4}$	16. $L: y=21+e^x;\ \ln 2\le x\le \ln 5$
17. $L: \begin{cases} x=6t, \\ y=3\ln(\sin 2t), \end{cases} -\frac{\pi}{4}\le t\le\frac{\pi}{3}$	18. $L: \rho=3\sin\varphi;\ \frac{\pi}{2}\le\varphi\le\frac{2\pi}{3}$
19. $V: \frac{x^2}{25}+\frac{y^2}{4}-\frac{z^2}{100}=1,\ z=12$	20. $y=(x-1)^2;\ x\ge 0,\ y\ge 0\ \ (0y)$
21. $\int_9^{+\infty} \frac{dx}{x^2-8x}$	22. $\int_1^{+\infty} \frac{\sin\left(\frac{1}{x}\right)}{x\sqrt{x}+14}dx$
23. $\int_1^3 \frac{1}{\sqrt{9-x^2}}dx$	24. $\int_0^1 \frac{x+3}{\sqrt{1-x^4}}dx$

Вариант 27

1. $\int \frac{\cos x - x\sin x}{(x\cos x)^2}\,dx$	2. $\int \sin 6x \sin 4x\,dx$
3. $\int (2-x)^2 e^{7x}\,dx$	4. $\int \frac{3x^2-13}{x^2-7x+6}\,dx$
5. $\int \frac{10x-2x^2}{(x-1)^2(x+1)}\,dx$	6. $\int \frac{4x^2-5x+25}{(x+5)(x^2-4x+5)}\,dx$
7. $\int \frac{2\cos x+3}{12\cos x-13}\,dx$	8. $\int \sin^4 4x\,dx$
9. $\int \frac{3+2\sqrt{x+4}}{2-3\sqrt{x+4}}\,dx$	10. $\int \frac{dx}{\left(\sqrt{x^2+1}\right)^3}$
11. $\int_0^e \ln x\,dx$	12. $\int_0^{\frac{\pi}{2}} \frac{2\cos x\,dx}{3-2\sin x}$
13. $D: x^2+y^2-2x=0,$ $y\ge 0$	14. $D: \begin{cases} x=t-\sin t, \\ y=1-\cos t, \end{cases} y=\frac{1}{2},$ $\left(y\ge 1/2,\ 0<x<2\pi\right)$
15. $D: \rho=3\cos\varphi,$ $-\frac{\pi}{4}\le\varphi\le\frac{\pi}{3}$	16. $L: y=\frac{e^x+e^{-x}}{2}+7;$ $0\le x\le 3$
17. $L: \begin{cases} x=4t, \\ y=4\ln(t^2-1), \end{cases} 3\le t\le 5$	18. $L: \rho=2e^{\frac{24\varphi}{7}};\ 0\le\varphi\le 1$
19. $V: \frac{x^2}{16}+\frac{y^2}{9}+\frac{z^2}{100}=1,$ $z=1,\ z=3$	20. $y^2=x-2\ \ (0y)$
21. $\int_{-\infty}^{4} \frac{dx}{x^2-8x+17}$	22. $\int_1^{+\infty} \frac{3x^2+\sqrt{(x+1)^3}}{\sqrt[3]{x^8}+15}\,dx$
23. $\int_6^7 \frac{x}{\sqrt[3]{x-6}}\,dx$	24. $\int_{-2}^{0} \frac{2+\cos x}{\sqrt{(x+2)^3}}\,dx$

Вариант 28

1. $\int \frac{\sqrt{\operatorname{arctg} x}\,dx}{1+x^2}$	2. $\int \sin 8x \cos 5x\,dx$
3. $\int (3-x-2x^2)\cos(2x)\,dx$	4. $\int \frac{4x^3-8x^2-x-2}{x^2-2x}dx$
5. $\int \frac{9x^2-x^3+5x-15}{x^3(x-3)}dx$	6. $\int \frac{3x^2-10x+1}{(x-5)(x^2-4x+8)}dx$
7. $\int \frac{dx}{9-\sin x+8\cos x}$	8. $\int \sin^4 5x \cos^4 5x\,dx$
9. $\int \sqrt{\frac{x+2}{x-1}}\,dx$	10. $\int \frac{x^4 dx}{\sqrt{4-x^2}}$
11. $\int_0^1 \arccos x\,dx$	12. $\int_0^{\frac{\pi}{2}} \frac{(\sin x+\cos x)\,dx}{1+3\cos x}$
13. $D: y=\sqrt{4-x^2},\ y=0,\ x=0,\ x=1$	14. $D: \begin{cases} x=\frac{1}{3}\cos t, \\ y=2\sin t \end{cases}$
15. $D: \rho=3\sqrt{\varphi},\ 0\le\varphi\le 9$	16. $L: y=7+\arccos\sqrt{x}-\sqrt{x-x^2};\ 0\le x\le 0{,}5$
17. $L: \begin{cases} x=3(t-\sin t), \\ y=3(1-\cos t), \end{cases} \frac{\pi}{2}\le t\le\pi$	18. $L: \rho=3\varphi;\ 2\le\varphi\le 3$
19. $V: \frac{x^2}{16}+\frac{y^2}{9}+\frac{z^2}{100}=1,\ z=0,\ z=\frac{x}{\sqrt{3}}\ (x\ge 0)$	20. $y=x^2-2x+1,\ 2\le x\le 3\ \ (0y)$
21. $\int_{-\infty}^{-1} \frac{dx}{x^2-8x}$	22. $\int_1^{+\infty} \frac{x^2+3x+1}{x^2 e^x}dx$
23. $\int_0^1 \frac{x^2}{\sqrt[3]{1-x^3}}dx$	24. $\int_3^4 \frac{5+\sin x}{\sqrt[3]{x-3}}dx$

Вариант 29

1. $\int x\left(1-x^2\right)^7 dx$	2. $\int \cos 2x \cos 3x\, dx$
3. $\int \ln\left(1+x^2\right) dx$	4. $\int \frac{6x^2+7}{x^2-x-6} dx$
5. $\int \frac{9x-2x^2+6}{(x+2)^2(x-2)} dx$	6. $\int \frac{2x^2+5x+50}{(x+5)\left(x^2+2x+10\right)} dx$
7. $\int \frac{dx}{10-6\cos x+3\sin x}$	8. $\int \sin^2 \frac{x}{3} \cos^2 \frac{x}{3} dx$
9. $\int \sqrt{\frac{x+4}{x-4}} dx$	10. $\int \frac{dx}{x^2\sqrt{x^2-4}}$
11. $\int_0^1 x \sin^2 x\, dx$	12. $\int_0^{\pi} \frac{\cos x\, dx}{1-2\cos x+\sin x}$
13. $D: x^2+y^2-4y=0,$ $y \geq 2$	14. $D: \begin{cases} x = 2\sqrt{2}\cos^3 t, \\ y = \sqrt{2}\sin^3 t, \end{cases} x = 1 \left(x \geq 1\right)$
15. $D: \rho = \frac{2}{\varphi\sqrt{\varphi}}, 1 \leq \varphi \leq 2$	16. $L: y = \frac{e^{2x}+e^{-2x}+6}{4};$ $0 \leq x \leq 1$
17. $L: \begin{cases} x = 5\cos^3 t, \\ y = 5\sin^3 t, \end{cases} \pi \leq t \leq \frac{3\pi}{2}$	18. $L: \rho = 2e^{2\varphi};\ 0 \leq \varphi \leq 2$
19. $V: z = 2x^2+18y^2,$ $z = 5$	20. $y = \sqrt[6]{x},$ $y \leq 1 \quad (0y)$
21. $\int_{-\infty}^{6} \frac{dx}{x^2-8x+20}$	22. $\int_1^{+\infty} \frac{4+\cos x}{\sqrt[3]{x^2+22}} dx$
23. $\int_3^4 \frac{4x}{\sqrt{16-x^2}} dx$	24. $\int_0^2 \frac{dx}{\sqrt{x}-\sqrt{2}}$

Вариант 30

. $\int \frac{2\operatorname{tg}x+3}{\cos^2 x}dx$	2. $\int \sin x \cos 6x\, dx$
3. $\int \left(4x-x^2\right)e^{2x}\, dx$	4. $\int \frac{3x^2-11x+8}{x^2-4x}dx$
5. $\int \frac{4x-3x^2-4x^3+4}{x^3(x+1)}dx$	6. $\int \frac{4x^2-17x+35}{(x-5)(x^2-2x+10)}dx$
7. $\int \frac{\sin x\, dx}{12\sin x+13}$	8. $\int \cos^4 7x\, dx$
9. $\int \frac{1+x+\sqrt[4]{x}}{2+\sqrt{x}}dx$	10. $\int \sqrt{36-x^2}dx$
11. $\int\limits_0^{\frac{\pi}{2}} e^x \cos x\, dx$	12. $\int\limits_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\cos x\, dx}{(1+\cos x)^2}$
13. $D: y=3x-x^2,\ y=0$	14. $D: \begin{cases} x=3{,}5\cos t, \\ y=3{,}5\sin t \end{cases}$
15. $D: \rho=7\operatorname{tg}\varphi,\ 0\le\varphi\le\frac{\pi}{4}$	16. $L: y=1/2\cdot(2-e^x-e^{-x}),\ 0\le x\le 2$
17. $L: \begin{cases} x=10\cos t-5\cos 2t, \\ y=10\sin t-5\sin 2t, \end{cases} \frac{\pi}{4}\le t\le\frac{\pi}{2}$	18. $L: \rho=\frac{2}{\varphi^2};\ \frac{1}{4}\le\varphi\le\frac{3}{4}$
19. $V: \frac{x^2}{27}+\frac{y^2}{3}-z^2=1,\ z=1,\ z=5$	20. $y=\ln\frac{x}{2};\ 1\le x\le 2e$ $(0y)$
21. $\int\limits_{-\infty}^{1} \frac{dx}{x^2-8x+15}$	22. $\int\limits_1^{+\infty} \frac{8+\sin x}{x\sqrt{x}+6x+1}dx$
23. $\int\limits_2^4 \frac{1}{\sqrt{16-x^2}}dx$	24. $\int\limits_0^1 \frac{\arccos x}{\sqrt[4]{1-x}}dx$