

3-SHAXSIY UY TOPSHIRIQLARI

Aniqmas integrallarni hisoblang.

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1.1.a) $\int \frac{dx}{x\sqrt{x^2+1}}$.

b) $\int (4-3x)e^{-3x} dx$.

d) $\int \frac{12-6x}{(x+1)(x^2-4x+13)} dx$

1.2.a) $\int \frac{1+\ln x}{x} dx$.

b) $\int \arctg \sqrt{4x-1} dx$.

d) $\int \frac{x^3+6x^2+13x+8}{x(x+2)^3} dx$.

1.3.a) $\int \frac{dx}{x\sqrt{x^2-1}}$.

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

d) $\int \frac{x^3-6x^2+13x-6}{(x+2)(x-2)^3} dx$.

1.4. a) $\int \frac{x^2+\ln x^2}{x} dx$.

b) $\int (4x-2)\cos 2x dx$.

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

1.5.a) $\int \frac{xdx}{\sqrt{x^4+x^2+1}}$.

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

d) $\int \frac{x^3-6x^2+11x-10}{(x+2)(x-2)^3} dx$.

1.6. a) $\int \frac{(\arccos x)^3-1}{\sqrt{1-x^2}} dx$.

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

d) $\int \frac{x^3+6x^2+11x+7}{(x+1)(x+2)^3} dx$.

1.7. a) $\int \operatorname{tg} x \ln \cos x dx$.

b) $\int \frac{xdx}{\cos^2 x}$.

d) $\int \frac{x^3+8x-2}{x^2(x^2+4)} dx$

1.8. a) $\int \frac{\operatorname{tg}(x+1)}{\cos^2(x+1)} dx$.

b) $\int \ln(x^2+4) dx$.

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

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

b) $\int (2-4x)\sin 2x dx$.

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

1.10.a) $\int \frac{1-\cos x}{(x-\sin x)^2} dx$.

b) $\int \arctg \sqrt{6x-1} dx$.

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

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

b) $\int (4-16x)\sin 4x dx$.

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

1.12. a) $\int \frac{xdx}{\sqrt{x^4-x^2-1}}$.

b) $\int e^{-3x}(2-9x) dx$.

d) $\int \frac{2x+22}{(x+2)(x^2-2x+10)} dx$

$$1.13. \quad a) \int \frac{dx}{\cos^2 x \sqrt{\operatorname{tg}^3 x}}$$

$$b) \int \operatorname{arctg} \sqrt{3x-1} dx.$$

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

$$1.14. \quad a) \int \frac{1/(2\sqrt{x}) + 1}{(\sqrt{x} + x)^2} dx.$$

$$b) \int \operatorname{arctg} \sqrt{5x-1} dx.$$

$$d) \int \frac{6x}{x^3 - 1} dx$$

$$1.15. \quad a) \int \frac{(x^2 + 1) dx}{(x^3 + 3x + 1)^5}.$$

$$b) \int (5x + 6) \cos 2x dx.$$

$$d) \int \frac{x^3 + 3x^2 - 12x + 4}{(x-1)^2(x^2 + 1)} dx$$

$$1.16. \quad a) \int \frac{4 \operatorname{arctg} x - x}{1 + x^2} dx.$$

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

$$d) \int \frac{2x^3 + 6x^2 + 7x + 1}{(x-1)(x+1)^3} dx.$$

$$1.17. \quad a) \int \frac{x - (\operatorname{arctg} x)^4}{1 + x^2} dx.$$

$$b) \int (x\sqrt{2} - 3) \cos 2x dx.$$

$$d) \int \frac{x^3 - 6x^2 + 10x - 10}{(x+1)(x-2)^3} dx.$$

$$1.18. \quad a) \int \frac{x + \cos x}{x^2 + 2 \sin x} dx.$$

$$b) \int \sin(\ln x) dx$$

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

$$1.19. \quad a) \int \frac{2 \cos x + 3 \sin x}{(2 \sin x - 3 \cos x)^3} dx.$$

$$b) \int (4x + 7) \cos 3x dx.$$

$$d) \int \frac{2x^3 + 6x^2 + 7x}{(x-2)(x+1)^3} dx.$$

$$1.20. \quad a) \int \frac{3x - \arccos 2x}{\sqrt{1-4x^2}} dx$$

$$b) \int \operatorname{arctg} \sqrt{2x+1} dx$$

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

$$1.21. \quad a) \int \frac{x^3 + x}{x^4 + 1} dx.$$

$$b) \int \frac{\ln(\cos x) dx}{\sin^2 x}$$

$$d) \int \frac{2x^3 + 6x^2 + 7x + 4}{(x+2)(x+1)^3} dx.$$

$$1.22. \quad a) \int \frac{5x - (\arcsin 3x)^3}{\sqrt{1-9x^2}} dx$$

$$b) \int \cos(\ln x) dx$$

$$d) \int \frac{x^3 + 6x^2 + 10x + 10}{(x-1)(x+2)^3} dx.$$

$$1.23. \quad a) \int \frac{x + \cos 2x}{\sqrt{x^2 + \sin 2x}} dx$$

$$b) \int \frac{\ln(\sin x) dx}{\cos^2 x}$$

$$d) \int \frac{x^3 + 6x^2 + 13x + 6}{(x-2)(x+2)^3} dx.$$

$$1.24. \quad a) \int \frac{3x \sin 3x - \cos 3x}{(x \cos 3x)^3} dx$$

$$b) \int \sin(\ln x) dx$$

$$d) \int \frac{x^3 - 6x^2 + 13x - 8}{x(x-2)^3} dx.$$

$$1.25. \quad a) \int \frac{\sqrt[3]{\operatorname{ctg}^2 3x}}{\sin^2 3x} dx$$

$$b) \int x \operatorname{arctg} 2x dx$$

$$d) \int \frac{x^3 - 6x^2 + 13x - 7}{(x+1)(x-2)^3} dx.$$

$$1.26. \quad a) \int \frac{3x - (\operatorname{arctg} x)^3}{\sqrt{1-x^2}} dx$$

$$b) \int x^2 \operatorname{arctg} x dx$$

$$d) \int \frac{x^3 + 6x^2 + 14x + 10}{(x+1)(x+2)^3} dx.$$

$$1.27. \quad a) \int \frac{3x + x^3}{x^4 + 2} dx$$

$$b) \int (1-6x)e^{2x} dx.$$

$$d) \int \frac{2x^3 + 6x^2 + 7x + 2}{x(x+1)^3} dx.$$

$$1.28. \quad a) \int \frac{x^2 - \ln^2 x}{x} dx$$

$$b) \int \frac{\arcsin x}{\sqrt{x+1}} dx$$

$$d) \int \frac{3x^3 + 9x^2 + 10x + 2}{(x-1)(x+1)^3} dx.$$

$$2.1. \quad a) \int \frac{\sin^3 2x}{\cos^2 2x} dx$$

$$b) \int \operatorname{tg}^4 3x dx$$

$$d) \int \frac{dx}{3 + \cos x + \sin x}$$

$$2.2. \quad a) \int \frac{\cos^3 x}{\sqrt[3]{\cos^4 x}} dx$$

$$b) \int \sin^4 2x dx$$

$$d) \int \frac{dx}{3\cos^2 x + 4\sin^2 x}$$

$$2.3. \quad a) \int \sin 4x \sin x dx$$

$$b) \int \operatorname{ctg}^4 5x dx$$

$$d) \int \frac{dx}{2 - 3\cos x + \sin x}$$

$$2.4. \quad a) \int \cos^4 3x \sin^2 3x dx$$

$$b) \int \sin^3 4x dx$$

$$d) \int \frac{dx}{4 + 3\cos x - 4\sin x}$$

$$2.5. \quad a) \int \cos 4x \sin x dx$$

$$1.29. \quad a) \int \frac{dx}{(1+x^2)\sqrt{(\operatorname{arctg} x)^3}}$$

$$b) \int x e^{-6x} dx$$

$$d) \int \frac{x^3 - 6x^2 + 14x - 6}{(x+1)(x-2)^3} dx.$$

$$1.30. \quad a) \int \frac{3\arcsin^2 x + 4x}{\sqrt{1-x^2}} dx$$

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

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

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$$b) \int \operatorname{tg}^3(4-x) dx$$

$$d) \int \frac{dx}{3 + 5\sin x + 3\cos x}$$

$$2.6. \quad a) \int \sqrt[3]{\cos^4 x} \sin^3 x dx$$

$$b) \int \operatorname{tg}^2(5x+1) dx$$

$$d) \int \frac{6\sin x + \cos x}{1 + \cos x} dx$$

$$2.7. \quad a) \int \sqrt[3]{\sin^4 x} \cos^3 x dx$$

$$b) \int \operatorname{tg}^5 4x dx$$

$$d) \int \frac{dx}{5 - 3\cos x}$$

$$2.8. \quad a) \int \cos^3 2x \sin^3 2x dx$$

$$b) \int \operatorname{ctg}^3 \frac{x}{2} dx$$

$$d) \int \frac{dx}{5 + 4\sin x}$$

$$2.9. \quad a) \int \cos^3 2x \sin^5 2x dx$$

$$b) \int \cos^4 3x dx$$

$$d) \int \frac{dx}{8 + 4\cos x}$$

2.10. a) $\int \cos x \sin 9x dx$

b) $\int \cos^3 4x dx$

d) $\int \frac{dx}{4\sin^2 x - 5\cos^2 x}$

2.11. a) $\int \cos 2x \cos 5x dx$

b) $\int xtg^2 x^2 dx$

d) $\int \frac{dx}{8 - 4\sin x + 7\cos x}$

2.12. a) $\int \cos^4 x \sin x dx$

b) $\int (1 - tg 2x)^2 dx$

d) $\int \frac{dx}{3 + 2\cos x - \sin x}$

2.13. a) $\int \sin 5x \sin 7x dx$

b) $\int (1 + ctg 2x)^2 dx$

d) $\int \frac{dx}{2\sin^2 x + 7\cos^2 x}$

2.14. a) $\int \sin^4 5x \cos 5x dx$

b) $\int (tg 2x + ctg 2x)^2 dx$

d) $\int \frac{dx}{8 + 7\cos x - 4\sin x}$

2.15. a) $\int \frac{\cos^3 x}{\sqrt[3]{\sin^5 x}} dx$

b) $\int (1 + \cos 3x)^2 dx$

d) $\int \frac{dx}{4\sin^2 x + 8\cos x \sin x}$

2.16. a) $\int \cos^4 x \sin 2x dx$

b) $\int ctg^2 \frac{x}{3} dx$

d) $\int \frac{dx}{3 + 3\cos x + 2\sin x}$

2.17. a) $\int \cos^3 x \sin 2x dx$

b) $\int tg^4 \frac{x}{3} dx$

d) $\int \frac{dx}{5\sin^2 x - 3\cos^2 x}$

2.18. a) $\int \sin 5x \cos 7x dx$

b) $\int tg^3 \frac{x}{2} dx$

d) $\int \frac{dx}{5 + 3\cos x + \sin x}$

2.19. a) $\int \cos 5x \sin 7x dx$

b) $\int ctg^4 \frac{x}{2} dx$

d) $\int \frac{dx}{3 + \cos x + \sin x}$

2.20. a) $\int \cos^5 x \sin^3 x dx$

b) $\int tg^4 3x dx$

d) $\int \frac{dx}{16\sin^2 x + 7\cos^2 x}$

2.21. a) $\int \cos^2 x \sin^4 x dx$

b) $\int ctg^3(x + 2) dx$

d) $\int \frac{dx}{7\sin x - 3\cos x}$

2.22. a) $\int \sqrt[5]{\cos^4 x} \sin 2x dx$

b) $\int \cos^4(x + 3) dx$

d) $\int \frac{dx}{4\cos x - 6\sin x}$

2.23. a) $\int \cos^2 3x \sin^2 3x dx$

b) $\int (1 - tg 3x)^2 dx$

d) $\int \frac{dx}{3 - 2\sin^2 x}$

2.24. a) $\int \cos^2 3x \sin^3 3x dx$

b) $\int (1 - \sin 3x)^2 dx$

d) $\int \frac{2 - \sin x + 3\cos x}{1 + \cos x} dx$

2.25. a) $\int \cos 5x \cos 7x dx$

$$\text{b) } \int \text{tg}^3(2x+3)dx$$

$$\text{d) } \int \frac{dx}{5+3\sin^2 x}$$

$$\mathbf{2.26.a) } \int \cos^3 x \sin^7 x dx$$

$$\text{b) } \int (2 + \sin 5x)^2 dx$$

$$\text{d) } \int \frac{7 + 6\sin x - 5\cos x}{1 + \cos x} dx$$

$$\mathbf{2.27.a) } \int \cos 2x \sin^2 x dx$$

$$\text{b) } \int (\text{tg} 3x - \text{ctg} 3x)^2 dx$$

$$\text{d) } \int \frac{dx}{6 - 3\cos^2 x}$$

$$\mathbf{2.28.a) } \int \sqrt[3]{\cos^2 3x} \sin 3x dx$$

$$\text{b) } \int \text{ctg}^3(2x-3)dx$$

$$\text{d) } \int \frac{dx}{2 + 3\cos x + 4\sin x}$$

$$\mathbf{2.29.a) } \int \sqrt[3]{\cos^2 x} \sin^3 x dx$$

$$\text{b) } \int \text{tg}^2 \frac{2x}{3} dx$$

$$\text{d) } \int \frac{\sin^2 x dx}{3\sin^2 x - \cos^2 x}$$

$$\mathbf{2.30.a) } \int \cos 2x \cos 7x dx$$

$$\text{b) } \int \text{tg}^4(x+3)dx$$

$$\text{d) } \int \frac{dx}{8 - 3\sin^2 x}$$

$$3.1. \quad \text{a) } \int \frac{\sqrt{x+1} dx}{\sqrt[3]{x+1} - \sqrt{x+1}}$$

$$\text{b) } \int \frac{(x+3) dx}{\sqrt{x^2 - 2x + 6}}$$

$$3.2. \quad \text{a) } \int \frac{x dx}{2 + \sqrt{x+4}}$$

$$\text{b) } \int \frac{dx}{x\sqrt{x^2 + x - 2}}$$

$$3.3. \quad \text{a) } \int \frac{\sqrt[6]{x+2} dx}{\sqrt[3]{x+2} + \sqrt{x+2}}$$

$$\text{b) } \int \frac{dx}{\sqrt{(4+x^2)^3}}$$

$$3.4. \quad \text{a) } \int \frac{dx}{\sqrt[3]{(2x+3)^2} - \sqrt{2x+3}}$$

$$\text{b) } \int \frac{dx}{x\sqrt{1+x-x^2}}$$

$$3.5. \quad \text{a) } \int \frac{(x-1) dx}{x\sqrt{x-2}}$$

$$\text{b) } \int \frac{dx}{\sqrt{(4+x^2)^3}}$$

$$3.6. \quad \text{a) } \int \frac{\sqrt{x+3} - \sqrt[3]{x+3}}{\sqrt[3]{(x+3)^2} + \sqrt{x+3}} dx$$

$$\text{b) } \int \frac{(x-3) dx}{\sqrt{2x^2 - 4x + 1}}$$

$$3.7. \quad \text{a) } \int \frac{\sqrt[3]{(x+1)^2} + \sqrt[6]{x+1}}{\sqrt{x+1} + \sqrt[3]{x+1}} dx$$

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

$$3.8. \quad \text{a) } \int \frac{\sqrt[4]{x} + \sqrt{x}}{\sqrt{x+1}} dx$$

$$\text{b) } \int \frac{(2x-10) dx}{\sqrt{1+x-x^2}}$$

$$3.9. \quad \text{a) } \int \frac{dx}{3 + \sqrt{x+5}}$$

$$\text{b) } \int \frac{(2x+5) dx}{\sqrt{9+8x+4x^2}}$$

$$3.10. \quad \text{a) } \int \frac{x + \sqrt[3]{x^2} + \sqrt[6]{x}}{x(1 + \sqrt[3]{x})} dx$$

$$\text{b) } \int \frac{(3x+4) dx}{\sqrt{13+6x+x^2}}$$

$$3.11. \quad \text{a) } \int \frac{\sqrt{x+1} - 2\sqrt[3]{x-1}}{\sqrt{x+1} + 2\sqrt[3]{x+1}} dx$$

$$\text{b) } \int \frac{(3x-1) dx}{\sqrt{2x^2 - 5x + 1}}$$

$$3.12. \quad \text{a) } \int \frac{(x+1) dx}{x\sqrt{x-1}}$$

$$\text{b) } \int \frac{(5x+2) dx}{\sqrt{x^2 + 3x - 4}}$$

$$3.13. \quad \text{a) } \int \frac{\sqrt{x+2} dx}{\sqrt[3]{x+2} + \sqrt[6]{x+2}}$$

$$\text{b) } \int \frac{(x-4) dx}{\sqrt{2x^2 - x + 7}}$$

$$3.14. \quad \text{a) } \int \frac{\sqrt{x+3} dx}{1 + \sqrt[3]{x+2}}$$

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

$$3.15. \quad \text{a) } \int \frac{(x+3) dx}{x\sqrt{x-4}}$$

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

$$3.16. \quad \text{a) } \int \frac{\sqrt{x} + \sqrt[3]{x}}{\sqrt{x} + \sqrt[6]{x}} dx$$

$$\text{b) } \int \frac{(5x-3) dx}{\sqrt{2x^2 + 4x - 5}}$$

- 3.17. a) $\int \frac{\sqrt{3x+1}-2}{\sqrt{3x+1}+2\sqrt[3]{3x+1}} dx$ b) $\int \frac{(3x+2)dx}{\sqrt{4+2x-x^2}}$
- 3.18. a) $\int \frac{(x^3-1)dx}{\sqrt{x+2}}$ b) $\int \frac{dx}{x\sqrt{x^2+x-3}}$
- 3.19. a) $\int \frac{\sqrt{x}-\sqrt[3]{x}}{\sqrt[3]{x}-\sqrt[6]{x}-1} dx$ b) $\int \frac{(x+5)dx}{\sqrt{3-6x-x^2}}$
- 3.20. a) $\int \frac{\sqrt[6]{3x+1}+1}{\sqrt{3x+1}-\sqrt[3]{3x+1}} dx$ b) $\int \frac{(x-9)dx}{\sqrt{4+2x-x^2}}$
- 3.21. a) $\int \frac{x^3 dx}{\sqrt{x-2}}$ b) $\int \frac{(3x-4)dx}{\sqrt{2x^2-6x+1}}$
- 3.22. a) $\int \frac{\sqrt{x}}{1-\sqrt[4]{x}} dx$ b) $\int \frac{(7x-1)dx}{\sqrt{2-3x-x^2}}$
- 3.23. a) $\int \frac{\sqrt{x}}{x-4\sqrt[3]{x^2}} dx$ b) $\int \frac{dx}{(x-1)\sqrt{1+x-x^2}}$
- 3.24. a) $\int \frac{x^2 dx}{\sqrt{x-3}}$ b) $\int \frac{dx}{x\sqrt{1-x-x^2}}$
- 3.25. a) $\int \frac{x-\sqrt[3]{x^2}}{x(1+\sqrt[6]{x})} dx$ b) $\int \frac{dx}{x\sqrt{x^2-3x+2}}$
- 3.26. a) $\int \frac{\sqrt{x-2}dx}{3+\sqrt{x-2}}$ b) $\int \frac{(7x+1)dx}{\sqrt{2-4x-x^2}}$
- 3.27. a) $\int \frac{\sqrt{x}}{3x+\sqrt[3]{x^2}} dx$ b) $\int \frac{dx}{(x+1)\sqrt{x^2-3x+2}}$
- 3.28. a) $\int \frac{dx}{3+\sqrt{x-5}}$ b) $\int \frac{dx}{x\sqrt{1-3x-2x^2}}$
- 3.29. a) $\int \frac{dx}{2+\sqrt{x-8}}$ b) $\int \frac{dx}{(x+1)\sqrt{2-x-x^2}}$
- 3.30. a) $\int \frac{\sqrt{x}}{1-\sqrt[3]{x}} dx$ b) $\int \frac{(5x+1)dx}{\sqrt{3-6x-x^2}}$

4

Quyidagi tenglamalar yordamida berilgan chiziqlar bilan chegaralangan figura yuzini hisoblang.

4.1. $r = 4 \sin^2 \varphi$

4.2. $x = 3(\cos t + t \sin t)$, $y = 3(\sin t - t \cos t)$, $y = 0$ ($0 \leq t \leq \pi$)

4.3. $r = 3 \sin 4\varphi$

- 4.4. $r = 4\cos 3\varphi, r = 2 (r \geq 2)$
- 4.5. $x = 4(t - \sin t), y = 4(1 - \cos t)$
- 4.6. $y = x + 1, y = \cos x, y = 0$
- 4.7. $x = 8\cos^3 t, y = \sin^3 t$
- 4.8. $x = 5(t - \sin t), y = 4(1 - \cos t)$
- 4.9. $r = 4\cos 3\varphi, r = 2(r \geq 2)$
- 4.10. $r = 6\sin 3\varphi, r = 3 (r \geq 3)$
- 4.11. $r = \cos \varphi + \sin \varphi$
- 4.12. $r = 1/2 + \sin \varphi$
- 4.13. $r = 6\cos 3\varphi, r = 3 (r \geq 3)$
- 4.14. $r = \cos 3\varphi$
- 4.15. $r = \sin \varphi, r = 2\sin \varphi$
- 4.16. $r = 1/2 + \cos \varphi$
- 4.17. $x = 7\cos^3 t, y = 7\sin^3 t$
- 4.18. $y^2 = x^3, x = 4, y = 0$
- 4.19. $r = \cos \varphi - \sin \varphi$
- 4.20. $r = 1 + \sqrt{2} \sin \varphi$
- 4.21. $r = 5(1 - \cos \varphi)$
- 4.22. $r = \sqrt{3} \cos \varphi, r = \sin \varphi, 0 \leq \varphi \leq \pi/2$
- 4.23. $x = 5\cos^3 t, y = 5\sin^3 t$
- 4.24. $r = 3(1 - \cos \varphi)$
- 4.25. $r = 6\cos 3\varphi, r = 3 (r \leq 3)$
- 4.26. $r = \sin 3\varphi$
- 4.27. $r = 2(1 - \cos \varphi), r = 2 (r \geq 2)$
- 4.28. $r = 5(1 + \cos \varphi)$
- 4.29. $r = 3(1 + \cos \varphi)$
- 4.30. $r = 3(1 + \cos \varphi)$

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Quyidagi tenglamalar orqali berilgan chiziqning yoyi uzunligini hisoblang.

- 5.1. $r = 5(1 + \cos \varphi)$
- 5.2.
$$\begin{cases} x = 3(2\cos t - \cos 2t), \\ y = 3(2\sin t - \sin 2t), \end{cases}$$

$$0 \leq t \leq 2\pi.$$
- 5.3. $y = 1 + \ln(\cos x), (0 \leq x \leq \pi/6)$

$$5.4. \quad \begin{cases} x = 4(\cos t + t \sin t), \\ y = 4(\sin t - t \cos t), \end{cases} \\ 0 \leq t \leq 2\pi.$$

$$5.5. \quad \begin{cases} x = (t^2 - 2)\sin t + 2t \cos t, \\ y = (2 - t^2)\cos t + 2t \sin t, \end{cases} \\ 0 \leq t \leq \pi.$$

$$5.6. \quad \begin{cases} x = 2 \sin^3 t \\ y = 2 \cos^3 t \end{cases} \quad 0 \leq t \leq \pi$$

$$5.7. \quad \begin{cases} x = e^t (\cos t + \sin t), \\ y = e^t (\cos t - \sin t), \end{cases} \\ 0 \leq t \leq \pi.$$

$$5.8. \quad \begin{cases} x = 4 \sin^3 t \\ y = 4 \cos^3 t \end{cases}$$

$$5.9. \quad \begin{cases} x = 3,5(2 \cos t - \cos 2t), \\ y = 3,5(2 \sin t - \sin 2t), \end{cases} \\ 0 \leq t \leq \pi/2.$$

$$5.10. \quad \begin{cases} x = 6 \cos^3 t, \\ y = 6 \sin^3 t, \end{cases} \\ 0 \leq t \leq \pi/3.$$

$$5.11. \quad \begin{cases} x = (t^2 - 2)\sin t + 2t \cos t, \\ y = (2 - t^2)\cos t + 2t \sin t, \end{cases} \\ 0 \leq t \leq \pi/3.$$

$$5.12. \quad \begin{cases} x = 8(\cos t + t \sin t), \\ y = 8(\sin t - t \cos t), \end{cases} \\ 0 \leq t \leq \pi/4.$$

$$5.13. \quad r = 2 \sin^3(\varphi/3), \quad (0 \leq \varphi \leq \pi/6)$$

$$5.14. \quad \begin{cases} x = 3(\cos t + t \sin t), \\ y = 3(\sin t - t \cos t), \end{cases} \\ 0 \leq t \leq \pi/3.$$

$$5.15. \quad \begin{cases} x = 3(t - \sin t), \\ y = 3(1 - \cos t), \end{cases} \\ \pi \leq t \leq 2\pi.$$

$$5.16. \begin{cases} x = e^t (\cos t + \sin t), \\ y = e^t (\cos t - \sin t), \end{cases} \\ \pi/2 \leq t \leq \pi.$$

$$5.17. \begin{cases} x = 2,5(t - \sin t), \\ y = 2,5(1 - \cos t), \end{cases} \\ \pi/2 \leq t \leq \pi.$$

$$5.18. \begin{cases} x = 3,5(2 \cos t - \cos 2t), \\ y = 3,5(2 \sin t - \sin 2t), \end{cases} \\ 0 \leq t \leq \pi/2.$$

$$5.19. \begin{cases} x = 6(\cos t + t \sin t), \\ y = 6(\sin t - t \cos t), \end{cases} \\ 0 \leq t \leq \pi.$$

$$5.20. \begin{cases} x = (t^2 - 2) \sin t + 2t \cos t, \\ y = (2 - t^2) \cos t + 2t \sin t, \end{cases} \\ 0 \leq t \leq \pi/2.$$

$$5.21. \begin{cases} x = 8 \cos^3 t, \\ y = 8 \sin^3 t, \end{cases} \\ 0 \leq t \leq \pi/6.$$

$$5.22. \begin{cases} x = (t^2 - 2) \sin t + 2t \cos t, \\ y = (2 - t^2) \cos t + 2t \sin t, \end{cases} \\ 0 \leq t \leq 2\pi.$$

$$5.23. \begin{cases} x = 4(t - \sin t), \\ y = 4(1 - \cos t), \end{cases} \\ \pi/2 \leq t \leq 2\pi/3.$$

5.24. $y^2 = x^3$ ning $x = 4$ bilan kesilgan qismi.

$$5.25. \begin{cases} x = 5 \sin^3 t \\ y = 5 \cos^3 t \end{cases} \quad 0 \leq t \leq \pi$$

6

Quyidagi chiziqlar bilan chegaralangan figuraning Ox o'qi(6.1-6.15 variantlar uchun), Oy o'qi(6.16-6.30 variantlar uchun) atrofida aylanishidan hosil bo'lgan jism hajmini toping.

6.1. $y^2 = x^3, x = 0, y = 4$

6.2. $x = 4(t - \sin t), y = 4(1 - \cos t), y = 0$

- 6.3. $y = 5 \cos x, y = \cos x, x = 0, x \geq 0$
- 6.4. $y = 2x - x^2, y = 4x - 2x^2$
- 6.5. $y = \sin^2 x, x = \pi/2, y = 0$
- 6.6. $x = \sqrt[3]{y-2}, x = 1, y = 1$
- 6.7. $y = xe^x, y = 0, x = 1$
- 6.8. $y = 2x - x^2, y = -x + 2, x = 0$
- 6.9. $y = 3 \sin x, y = \sin x, 0 \leq x \leq \pi$
- 6.10. $x = 3 \cos^2 t, y = 2 \sin^2 t$
- 6.11. $y = \arccos x, y = \arcsin x, x = 0$
- 6.12. $(y-1)^2 = x, y = x-1$
- 6.13. $y = x^3, y = x^2$
- 6.14. $y = (x-2)^2, y = 4-x, y = 0$
- 6.15. $x = 2 \cos^2 t, y = 5 \sin^2 t$
- 6.16. $x = 2 \cos^3 t, y = 2 \sin^3 t$
- 6.17. $y = \arccos x, y = \arcsin x, y = 0$
- 6.18. $y = (x-1)^2, y = 1$
- 6.19. $y^2 = x-2, y = x^3, y = 0, y = 1$
- 6.20. $y = x^3, y = x^2$
- 6.21. $y = \arccos(x/5), y = \arcsin(x/3), y = 0$
- 6.22. $(y-1)^2 = x, y = x-1$
- 6.23. $y = (x-2)^2, y = 4-x$
- 6.24. $y = \arccos x, y = \arcsin x, x = 0$
- 6.25. $y = (x-1)^2, x = 0, x = 3, y = 0$
- 6.26. $x = 2 \cos^2 t, y = 5 \sin^2 t$
- 6.27. $y = x^3, y = x$
- 6.28. $y = (x-1)^2, x = 3, y = 0$
- 6.29. $x = 2 \cos^2 t, y = 5 \sin^2 t$
- 6.30. $y = (x-2)^2, y = 4-x, y = 0$

7

Xosmas integrallarni hisoblang yoki uzoqlashuvchi ekanini isbotlang.

5.1. a) $\int_0^{\infty} \frac{xdx}{16x^2 + 1}$

b) $\int_0^1 \frac{dx}{\sqrt{2-4x}}$

5.2. $\int_1^{\infty} \frac{16xdx}{16x^4 - 1}$

b) $\int_{-1}^3 \frac{2x-3}{\sqrt[3]{x^2}} dx$

$$5.3. \text{ a) } \int_0^{\infty} \frac{x^3 dx}{\sqrt{16x^4 + 1}}$$

$$5.4. \text{ a) } \int_1^{\infty} \frac{xdx}{\sqrt{16x^4 - 1}}$$

$$5.5. \text{ a) } \int_{-\infty}^0 \frac{xdx}{\sqrt{(x^2 + 1)^3}}$$

$$5.6. \text{ a) } \int_0^{\infty} \frac{x^2 dx}{\sqrt[3]{(x^3 + 1)^4}}$$

$$5.7. \text{ a) } \int_0^{\infty} \frac{xdx}{\sqrt[4]{(x^2 + 16)^5}}$$

$$5.8. \text{ a) } \int_4^{\infty} \frac{xdx}{\sqrt{x^2 - 4x + 1}}$$

$$5.9. \text{ a) } \int_1^{\infty} \frac{xdx}{x^2 - 4x + 5}$$

$$5.10. \text{ a) } \int_{-1}^{\infty} \frac{dx}{x^2 + 4x + 5}$$

$$5.11. \text{ a) } \int_1^{\infty} \frac{\operatorname{arctg} 2x}{4x^2 + 5} dx$$

$$5.12. \text{ a) } \int_0^{\infty} \frac{dx}{4x^2 + 4x + 5}$$

$$5.13. \text{ a) } \int_0^{\infty} \frac{xdx}{9x^2 + 6x + 5}$$

$$5.14. \text{ a) } \int_0^{\infty} \frac{(x + 3)dx}{\sqrt[3]{x^2 + 6x + 5}}$$

$$5.15. \text{ a) } \int_0^{\infty} \frac{3 - x^2}{x^2 + 4} dx$$

$$5.16. \text{ a) } \int_0^{\infty} \frac{3 + \sqrt{\operatorname{arctg} 3x} dx}{9x^2 + 1}$$

$$5.17. \text{ a) } \int_1^{\infty} \frac{4dx}{x(1 + \ln^2 x)}$$

$$5.18. \text{ a) } \int_0^{\infty} x \sin x dx$$

$$5.19. \text{ a) } \int_{-\infty}^{-1} \frac{5dx}{(x^2 - 4x) \ln 3}$$

$$\text{ b) } \int_0^1 \frac{e^{1/x}}{x^2} dx$$

$$\text{ b) } \int_1^3 \frac{dx}{\sqrt[3]{2 - 4x}}$$

$$\text{ b) } \int_{1/2}^2 \frac{\ln(2x - 1)}{2x - 1} dx$$

$$\text{ b) } \int_{1/4}^1 \frac{dx}{20x^2 - 9x + 1}$$

$$\text{ b) } \int_{1/2}^1 \frac{dx}{(1 - x) \ln^2(1 - x)}$$

$$\text{ b) } \int_0^{2/3} \frac{\sqrt[3]{\ln(2 - 3x)}}{2 - 3x} dx$$

$$\text{ b) } \int_0^1 \frac{xdx}{1 - x^4}$$

$$\text{ b) } \int_0^{\pi/6} \frac{\cos 3x}{\sqrt[3]{(1 - \sin 3x)^2}} dx$$

$$\text{ b) } \int_0^1 \frac{2xdx}{\sqrt{1 - x^4}}$$

$$\text{ b) } \int_0^{1/3} \frac{\cos x dx}{\sqrt[7]{\sin^2 x}}$$

$$\text{ b) } \int_{4/5}^1 \frac{5dx}{\sqrt[3]{4 - 5x}}$$

$$\text{ b) } \int_0^{\pi/2} \frac{e^{\operatorname{tg} x} dx}{\cos^2 x}$$

$$\text{ b) } \int_0^1 \frac{e^{\pi - \arcsin x} dx}{\pi \sqrt{1 - x^2}}$$

$$\text{ b) } \int_1^2 \frac{3dx}{\sqrt[3]{4x - x^2 - 4}}$$

$$\text{ b) } \int_{\pi/2}^{\pi} \frac{\sin 2x dx}{\sqrt[3]{1 - \cos^2 x}}$$

$$\text{ b) } \int_0^{1/3} \frac{5dx}{\sqrt[3]{1 - 3x}}$$

$$\text{ b) } \int_1^3 \frac{xdx}{\sqrt[3]{(x^2 - 1)^4}}$$

$$5.20.a) \int_0^{\infty} \frac{\pi dx}{(1+4x^2) \arctg^2 2x}$$

$$b) \int_0^{1/3} \frac{dx}{9x^2 - 9x + 2}$$

$$5.21.a) \int_1^{\infty} \frac{(2x+1)dx}{\sqrt{4x^2 + 4x + 5}}$$

$$b) \int_0^{\pi/2} \frac{3\sin^3 x dx}{\sqrt{\cos x}}$$

$$5.22.a) \int_0^{\infty} \frac{dx}{(x^2 + 2x) \ln 5}$$

$$b) \int_0^1 \frac{x^4 dx}{\sqrt[3]{1-x^5}}$$

$$5.23.a) \int_0^{\infty} 2xe^{-3x} dx$$

$$b) \int_0^{\sqrt{5}} \frac{\sqrt[3]{5x} dx}{\sqrt[3]{5-x^2}}$$

$$5.24.a) \int_{-\infty}^0 3xe^{2x} dx$$

$$b) \int_0^3 \frac{2x^2 dx}{\sqrt{9-x^6}}$$

$$5.25.a) \int_0^{\infty} x^3 e^{-x^2} dx$$

$$b) \int_0^{1/5} \frac{3x dx}{\sqrt[5]{1-25x^2}}$$

$$5.26.a) \int_1^{\infty} \frac{(2x+1)dx}{\sqrt{3x^2 + 3x + 4}}$$

$$b) \int_0^{\frac{\pi}{2}} \frac{3\cos^3 x}{\sqrt{\sin x}} dx$$

$$5.27.a) \int_0^{\infty} 5xe^{-2x} dx$$

$$b) \int_0^1 \frac{x^3}{\sqrt[4]{1-x^4}} dx$$

$$5.28.a) \int_1^{\infty} \frac{(2x+1)dx}{\sqrt{5x^2 + 5x + 6}}$$

$$b) \int_0^{\frac{1}{2}} \frac{xdx}{\sqrt{1-4x^2}}$$

$$5.29.a) \int_1^{\infty} \frac{\ln x dx}{x\sqrt{\ln^2 x + 4}}$$

$$b) \int_0^{\frac{\pi}{2}} \frac{\sin 2x}{\sqrt{4-\sin^2 x}} dx$$

$$5.30.a) \int_1^{\infty} \frac{dx}{x(\ln^2 x + 4)}$$

$$b) \int_0^{\frac{\pi}{2}} \frac{\sin 2x}{\sqrt[3]{9-\sin^2 x}} dx$$