

ДОМАШНА РАБОТА №7

1) Пресметнете интеграла:

$$1.1. \int_1^2 5x^4 - 9x^2 - 12x + 3 dx;$$

$$1.2. \int_0^1 9x^8 + 12x^5 - 6x^2 - 2 dx;$$

$$1.3. \int_0^2 6x^5 + 8x^3 - 10x - 2 dx;$$

$$1.4. \int_0^1 16x^7 - 4x^3 + 2x - 10 dx;$$

$$1.5. \int_1^2 7x^6 + 10x^4 - 8x^3 + 5 dx;$$

$$1.6. \int_{-1}^1 10x^9 + 6x^5 - 12x^2 + 7 dx;$$

$$1.7. \int_{-2}^2 10x^4 - 12x^2 + 2x + 1 dx;$$

$$1.8. \int_2^3 12x^3 - 3x^2 - 4x - 15 dx;$$

$$1.9. \int_1^3 4x^3 + 6x^2 - 8x + 5 dx;$$

$$1.10. \int_{-1}^1 8x^7 - 5x^4 - 8x^3 - 3 dx.$$

2) Пресметнете интеграла:

$$2.1. \int_1^8 \sqrt[3]{x} + \frac{6}{\sqrt[3]{x}} dx;$$

$$2.2. \int_1^{16} \sqrt[4]{x} - \frac{2}{\sqrt[4]{x}} dx;$$

$$2.3. \int_1^e \frac{3}{x} - \frac{5}{x^6} dx;$$

$$2.4. \int_1^e \frac{4}{x} - \frac{7}{x^2} dx;$$

$$2.5. \int_1^4 \frac{4}{\sqrt{x}} - \sqrt{x} dx;$$

$$2.6. \int_1^9 \frac{2}{\sqrt{x}} + \sqrt{x} dx;$$

$$2.7. \int_1^8 \sqrt[3]{x} - \sqrt{x^3} dx;$$

$$2.8. \int_1^2 \sqrt[5]{x} - \sqrt{x^5} dx;$$

$$2.9. \int_1^e \frac{9}{x} + \sqrt{x^7} dx;$$

$$2.10. \int_1^e \frac{4}{x} + \sqrt{x^5} dx.$$

3) Пресметнете интеграла:

$$3.1. \int_0^{\frac{\pi}{4}} \frac{dx}{\cos^2 x}; \quad 3.2. \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \frac{dx}{\sin^2 x}; \quad 3.3. \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \sin x dx; \quad 3.4. \int_{\frac{\pi}{2}}^{\pi} \cos x dx; \quad 3.5. \int_0^1 \frac{dx}{1+x^2}$$

$$3.6. \int_0^{\frac{1}{2}} \frac{dx}{\sqrt{1-x^2}}; \quad 3.7. \int_2^6 \sqrt{x-2} dx; \quad 3.8. \int_0^{16} \sqrt{x+9} dx; \quad 3.9. \int_0^9 \frac{dx}{\sqrt{x+16}}; \quad 3.10. \int_0^9 \frac{dx}{\sqrt{25-x}}$$

4) Пресметнете интеграла:

$$\begin{array}{llll}
 4.1. \int_0^{\frac{\pi}{4}} \sin 2x \, dx; & 4.2. \int_0^{\frac{\pi}{6}} \cos 3x \, dx; & 4.3. \int_0^2 e^{-3x+6} \, dx; & 4.4. \int_0^{\frac{1}{4}} 3^{4x-1} \, dx; \\
 4.5. \int_{\frac{\pi}{12}}^{\frac{\pi}{6}} \frac{1}{\sin^2 3x} \, dx; & 4.6. \int_0^{\frac{\pi}{20}} \frac{1}{\cos^2 5x} \, dx; & 4.7. \int_0^{\pi} \sin \frac{3x}{2} \, dx; & 4.8. \int_0^{\pi} \cos \frac{5x}{4} \, dx; \\
 4.9. \int_0^{3\pi} \sin \frac{x}{6} \, dx; & 4.10. \int_0^{2\pi} \cos \frac{x}{4} \, dx.
 \end{array}$$

5) Пресметнете интеграла:

$$\begin{array}{ll}
 5.1. \int_0^1 (6x-5)e^{2x} \, dx; & 5.2. \int_0^3 (2x-5)e^{-x} \, dx; \\
 5.3. \int_0^2 (3x+1)e^{3x} \, dx; & 5.4. \int_1^2 (4x+7)e^{-2x} \, dx; \\
 5.5. \int_{-1}^1 (6x-1)e^{4x} \, dx; & 5.6. \int_0^1 (5x-3)e^{-3x} \, dx; \\
 5.7. \int_0^3 (2x-3)e^{5x} \, dx; & 5.8. \int_{-1}^1 (-x+7)e^{-4x} \, dx; \\
 5.9. \int_0^1 (x+2)e^{6x} \, dx; & 5.10. \int_1^2 (8x-3)e^{-5x} \, dx.
 \end{array}$$

6) Пресметнете интеграла:

$$\begin{array}{ll}
 6.1. \int_0^{\frac{\pi}{8}} (8x-5) \sin 4x \, dx; & 6.2. \int_0^{\frac{\pi}{2}} (6x-2) \cos x \, dx; \\
 6.3. \int_0^{\pi} (3x+2) \sin \frac{x}{2} \, dx; & 6.4. \int_0^{3\pi} (-x+5) \cos \frac{x}{3} \, dx; \\
 6.5. \int_0^{\pi} (2x-3) \sin \frac{x}{3} \, dx; & 6.6. \int_{\pi}^{2\pi} (2x-5) \cos \frac{x}{2} \, dx; \\
 6.7. \int_0^{\frac{\pi}{3}} (6x+7) \sin 3x \, dx; & 6.8. \int_0^{\frac{\pi}{6}} (12x+7) \cos 2x \, dx; \\
 6.9. \int_0^{\frac{\pi}{10}} (10x-1) \sin 5x \, dx; & 6.10. \int_0^{\frac{\pi}{6}} (6x-7) \cos 3x \, dx.
 \end{array}$$

7) Пресметнете интеграла:

$$7.1. \int_1^e (8x-5) \ln x \, dx;$$

$$7.2. \int_1^e (12x^2+4) \ln x \, dx;$$

$$7.3. \int_1^e (16x^3-3) \ln x \, dx;$$

$$7.4. \int_1^e (25x^4-12) \ln x \, dx;$$

$$7.5. \int_1^e (16x^3-4x+7) \ln x \, dx;$$

$$7.6. \int_1^e (25x^4-8x-9) \ln x \, dx;$$

$$7.7. \int_1^2 (4x-9) \ln 2x \, dx;$$

$$7.8. \int_1^3 (8x+7) \ln 3x \, dx;$$

$$7.9. \int_1^2 (9x^2-4x) \ln x \, dx;$$

$$7.10. \int_1^4 (-8x+9) \ln x \, dx.$$

8) Пресметнете интеграла:

$$8.1. \int_1^4 \frac{8x+1}{x^2-x-6} \, dx;$$

$$8.2. \int_0^5 \frac{8x-7}{x^2-3x-4} \, dx;$$

$$8.3. \int_2^4 \frac{x+13}{x^2+2x-3} \, dx;$$

$$8.4. \int_0^3 \frac{11x-1}{x^2-x-2} \, dx;$$

$$8.5. \int_0^4 \frac{dx}{1+\sqrt{x}};$$

$$8.6. \int_0^9 \frac{dx}{\sqrt{x+5}};$$

$$8.7. \int_6^9 \frac{2x-7}{\sqrt{x-5}} \, dx;$$

$$8.8. \int_3^8 \frac{4x+1}{\sqrt{x+1}} \, dx;$$

$$8.9. \int_4^7 \frac{2x+5}{\sqrt{x-3}} \, dx;$$

$$8.10. \int_0^5 \frac{3x-2}{\sqrt{x+4}} \, dx.$$

9) Пресметнете лицето на фигурата, ограничена от кривите:

$$9.1. y = x^2 - 3x, y = -3x + 4;$$

$$9.2. y = x^2 - 1, y = -x - 1;$$

$$9.3. y = x^2 + 2x, y = 2x + 4;$$

$$9.4. y = x^2 + 4x, y = 4x + 1;$$

$$9.5. y = x^2 - 9, y = 2x - 9;$$

$$9.6. y = x^2 - 4, y = 3x - 4;$$

$$9.7. y = x^2 - 2x, y = -2x + 1;$$

$$9.8. y = x^2 - 2x - 3, y = x - 3;$$

$$9.9. y = x^2 + x - 2, y = x + 2;$$

$$9.10. y = -x^2 + 3x, y = 3x - 4.$$

10) Пресметнете границата:

$$10.1. \lim_{n \rightarrow \infty} (\sqrt{n+2} - \sqrt{n});$$

$$10.2. \lim_{n \rightarrow \infty} (\sqrt{n+5} - \sqrt{n+2});$$

$$10.3. \lim_{n \rightarrow \infty} (\sqrt{n^2+4} - \sqrt{n^2-4});$$

$$10.4. \lim_{n \rightarrow \infty} (\sqrt{n^2+4} - \sqrt{n^2+1});$$

$$10.5. \lim_{n \rightarrow \infty} (\sqrt{n^2+2n+5} - \sqrt{n^2+2n-5});$$

$$10.6. \lim_{n \rightarrow \infty} (\sqrt{n^2+n+6} - \sqrt{n^2+n-6});$$

$$10.7. \lim_{n \rightarrow \infty} (\sqrt{n^2+4} - n);$$

$$10.8. \lim_{n \rightarrow \infty} (n - \sqrt{n^2-2});$$

$$10.9. \lim_{n \rightarrow \infty} (\sqrt{n^3+1} - \sqrt{n^3});$$

$$10.10. \lim_{n \rightarrow \infty} (\sqrt{n^3} - \sqrt{n^3-3}).$$

11) Пресметнете границата:

$$11.1. \lim_{n \rightarrow \infty} \left(1 + \frac{3}{n}\right)^n;$$

$$11.2. \lim_{n \rightarrow \infty} \left(1 - \frac{5}{n}\right)^n;$$

$$11.3. \lim_{n \rightarrow \infty} \left(1 + \frac{4}{n}\right)^{2n};$$

$$11.4. \lim_{n \rightarrow \infty} \left(1 - \frac{2}{n}\right)^{3n};$$

$$11.5. \lim_{n \rightarrow \infty} \left(1 + \frac{1}{6n}\right)^{\frac{n}{3}};$$

$$11.6. \lim_{n \rightarrow \infty} \left(1 - \frac{1}{8n}\right)^{\frac{n}{4}};$$

$$11.7. \lim_{n \rightarrow \infty} \left(\frac{n+2}{n}\right)^n;$$

$$11.8. \lim_{n \rightarrow \infty} \left(\frac{n-3}{n}\right)^n;$$

$$11.9. \lim_{n \rightarrow \infty} \left(\frac{n+1}{n}\right)^{2n+1};$$

$$11.10. \lim_{n \rightarrow \infty} \left(\frac{n-1}{n}\right)^{3n+2}.$$

12) Пресметнете границата:

$$12.1. \lim_{n \rightarrow \infty} \frac{-3n^3 + 2n^2 - 5}{n^3 + 4};$$

$$12.2. \lim_{n \rightarrow \infty} \frac{4n^4 + 2n^3 - 5n}{n^3 + n - 4};$$

$$12.3. \lim_{n \rightarrow \infty} \frac{4n^3 + 2n^2 + 3n - 5}{2n^3 - 3n + 2};$$

$$12.4. \lim_{n \rightarrow \infty} \frac{2n^2 + 5n - 6}{2n^3 - 3n + 2};$$

$$12.5. \lim_{n \rightarrow \infty} \frac{6n^4 + 3n^2 - n - 2}{2n^3 - 5n + 4};$$

$$12.6. \lim_{n \rightarrow \infty} \frac{6n^3 + 3n^2 - n - 2}{2n^4 - 5n^2 + 4n};$$

$$12.7. \lim_{n \rightarrow \infty} \frac{8n^5 + 3n^3 - n - 2}{4n^5 + n^2 + 7};$$

$$12.8. \lim_{n \rightarrow \infty} \frac{2n^5 + 3n^2 - 3n + 1}{2n^7 + n^3 + 7n};$$

$$12.9. \lim_{n \rightarrow \infty} \frac{4n^4 + 2n^2 - 2}{4n^3 + n^2 + 7n - 1};$$

$$12.10. \lim_{n \rightarrow \infty} \frac{3n^4 + 3n^2 - 2n + 5}{n^4 - 2n^2 + 5n + 8}.$$