

28.03. Vypočtete integrály:

$$1. \int_{-\infty}^{+\infty} \frac{x^2 dx}{(x^2 + 1)(x^2 + 9)};$$

$$3. \int_{-\infty}^{+\infty} \frac{dx}{x^2 - 2ix - 2};$$

$$5. \int_{-\infty}^{+\infty} \frac{x^4 + 1}{x^6 + 1} dx;$$

$$7. \int_{-\infty}^{+\infty} \frac{dx}{(x^2 + 1)^3};$$

$$9. \int_0^{+\infty} \frac{x^2 dx}{(x^2 + a^2)^3}, \quad a > 0;$$

$$11. \int_{-\infty}^{+\infty} \frac{dx}{(x^2 - 2ix - 1 - a^2)^3}, \quad a > 0;$$

$$12. \int_0^{+\infty} \frac{x^4 dx}{(a + bx^2)^4}, \quad a > 0, \quad b > 0;$$

$$13. \int_{-\infty}^{+\infty} \frac{dx}{(x^2 + a^2)(x^2 + b^2)^2}, \quad a > 0, \quad b > 0;$$

$$14. \int_{-\infty}^{+\infty} \frac{dx}{(x^2 - 2i\alpha x - \alpha^2 - \beta^2)^n}, \quad \alpha > 0, \quad \beta > 0, \quad n = 1, 2, \dots;$$

$$2. \int_{-\infty}^{+\infty} \frac{x^2 - x + 2}{x^4 + 10x^2 + 9} dx;$$

$$4. \int_{-\infty}^{+\infty} \frac{x^2 + 1}{x^4 + 1} dx;$$

$$6. \int_{-\infty}^{+\infty} \frac{x^2 dx}{x^4 + 6x^2 + 25};$$

$$8. \int_{-\infty}^{+\infty} \frac{x^2 dx}{(x^2 + 4ix - 5)^2};$$

$$10. \int_0^{+\infty} \frac{x^6 dx}{(x^4 + a^4)^2}, \quad a > 0;$$

28.03.

1. $\pi/4$; 2. $5\pi/12$; 3. 0; 4. $\pi\sqrt{2}$; 5. $4\pi/3$; 6. $\pi/4$; 7. $3\pi/8$;
8. 0; 9. $\pi/16a^3$; 10. $3\pi\sqrt{2}/(16a)$; 11. 0; 12. $\pi a^{-3/2}b^{-5/2}/32$;
13. $\pi(2b + a)/[2ab^3(a + b)^2]$; 14. 0;
15. $2^{1-n}\pi a^{-n}\sqrt{(a/b)[1 \cdot 3 \dots (2n - 3)/(n - 1)!]}$.

28.05. Vypočtěte integrály:

$$1. \int_{-\infty}^{+\infty} \frac{(x-1)e^{ix}}{x^2-2x+2} dx;$$

$$3. \int_{-\infty}^{+\infty} \frac{e^{ix} dx}{(x^2+4ix-5)^3};$$

$$5. \int_{-\infty}^{+\infty} \frac{(x+1)e^{-3ix}}{x^2-2x+5} dx;$$

$$2. \int_{-\infty}^{+\infty} \frac{e^{ix} dx}{x^2-2ix-2};$$

$$4. \int_{-\infty}^{+\infty} \frac{(x-3)e^{ix}}{x^2-6x+109} dx;$$

$$6. \int_{-\infty}^{+\infty} \frac{e^{-ix} dx}{x^4+8x^2+16};$$

28.05.

1. $\pi i e^{-1+i}$; 2. $-2\pi e^{-1} \sin 1$; 3. 0; 4. $\pi i e^{3i-10}$;
5. $\pi(1-i) e^{-3i-6}$; 6. $3\pi e^{-2}/32$; 7. $\pi(1+i) e^{-1}$;

28.15. Vypočtete integrály:

1. $\int_{-\pi}^{\pi} \frac{d\varphi}{5 + 3 \cos \varphi};$

2. $\int_{-\pi}^{\pi} \frac{d\varphi}{13 + 12 \sin \varphi};$

3. $\int_0^{2\pi} \frac{\cos^2 \varphi}{13 + 12 \cos \varphi} d\varphi;$

4. $\int_0^{\pi} \frac{\cos^4 \varphi}{1 + \sin^2 \varphi} d\varphi;$

5. $\int_0^{\pi} \cotg(\varphi - ia) d\varphi, \quad a > 0;$

6. $\int_0^{\pi} e^{2i\varphi} \cotg(\varphi - ia) d\varphi, \quad a > 0;$

7. $\int_{-\pi}^{\pi} \frac{\sin^2 \varphi d\varphi}{1 - 2a \cos \varphi + a^2}; \quad \text{a) } a > 1; \quad \text{b) } -1 < a < 1; \quad \text{c) } a = 1;$

28.15.

1. $\pi/2$; 2. $2\pi/5$; 3. $13\pi/45$; 4. $2\pi(\sqrt{2} - \frac{5}{4})$; 5. πi ; 6. $2\pi i e^{-2a}$;
7. a) π/a^2 ; b) π ; c) π ; 8. a) $2\pi/\sqrt{(a^2 - 1)}$; b) 0;