

**VIII.** Да се изследват за сходимост интегралите:

$$1. \int_a^{\infty} \frac{\ln x}{x} dx, \quad 2. \int_{e^2}^{\infty} \frac{dx}{x \ln^3 x}, \quad 3. \int_{-\infty}^0 \frac{\operatorname{arctg} x dx}{1+x^2}, \quad 4. \int_{-\infty}^{\infty} \frac{dx}{1+x^2},$$

$$5. \int_0^a \frac{dx}{x-1}, \quad 6. \int_0^a \frac{dx}{\sqrt{a-x}}, \quad 7. \int_0^9 \frac{dx}{\sqrt{x-a}}, \quad 8. \int_0^9 \frac{x dx}{x^2 - a^2}.$$