

(2)

IV. Исследовать на сходимость ряд с общим членом:

1.a)
$$\sum_{n=1}^{\infty} (-1)^n \frac{2n+3}{n(n+1)}$$

b)
$$u_n = (-1)^{n+1} \frac{n}{5^n}$$

2.a)
$$u_n = (-1)^{n-1} \frac{1}{\ln(n+1)}$$

b)
$$u_n = (-1)^n \frac{n+2}{n(n+3)}$$

3.a)
$$u_n = (-1)^n \operatorname{tg} \frac{3}{n+1}$$

b)
$$u_n = (-1)^{n-1} \frac{n+1}{2^n}$$

4.a)
$$u_n = (-1)^{n+1} \frac{n+2}{(n+1)(n+3)}$$

b)
$$u_n = (-1)^n \frac{\ln(n+1)}{n}$$

5.a)
$$u_n = (-1)^{n-1} \frac{n^2}{n^3+1}$$

b)
$$u_n = (-1)^n \operatorname{tg} \frac{2}{n+3}$$

6.a)
$$u_n = (-1)^{n+1} \sin \frac{\pi}{n+2}$$

b)
$$u_n = (-1)^n \frac{n}{2^n}$$

7.a)
$$u_n = (-1)^{n-1} \frac{n+1}{3^{n-1}}$$

b)
$$u_n = \frac{(-1)^n}{(n+1)\ln(n+1)}$$

8.a)
$$u_n = (-1)^{n+2} \frac{n+2}{2^n}$$

b)
$$u_n = \frac{(-1)^n}{n \ln(n+2)}$$

$$9.a) U_n = (-1)^{n+1} \frac{n-1}{3^{n+2}}$$

$$b) U_n = (-1)^n \left(\frac{n}{2n+1} \right)^n$$

10.a)

$$U_n = (-1)^{n-1} \frac{n+2}{5^n}$$

$$b) U_n = (-1)^n \left(\frac{n+1}{3n+2} \right)^n$$

11.a)

$$U_n = (-1)^n \frac{n}{(n+1)(n+2)}$$

b)

$$U_n = (-1)^{n+1} \operatorname{tg} \frac{2}{n+3}$$

12.a)

$$U_n = (-1)^{n+1} \frac{n}{(n+1) \ln(n+2)}$$

b)

$$U_n = \frac{(-1)^n}{n \sqrt{n+1}}$$

13.a)

$$U_n = (-1)^{n-1} \frac{n^2}{n^4 + n^2 + 4}$$

b)

$$U_n = (-1)^n \left(\frac{n}{3n+2} \right)^n$$

14.a)

$$U_n = (-1)^n \frac{n+3}{(n+1)(n+2)}$$

b)

$$U_n = (-1)^{n+1} \operatorname{tg} \frac{3n}{n^3+2}$$

15.a)

$$U_n = (-1)^{n+1} \sin \frac{2}{3n+5}$$

b)

$$U_n = (-1)^n \frac{n+2}{(n+1)(n+3)}$$

16.a)

$$U_n = (-1)^{n-1} \operatorname{tg} \frac{3}{n+2}$$

b)

$$U_n = (-1)^n \frac{n+3}{n(n+5)}$$

17.a)

$$u_n = (-1)^n \frac{3}{\ln(n+2)}$$

b)

$$u_n = (-1)^{n+1} \left(\frac{n}{2n+1}\right)^n$$

18.a)

$$u_n = (-1)^{n+2} \frac{\ln(n+1)}{n^2}$$

b)

$$u_n = (-1)^n \frac{n+1}{n(n+2)}$$

19.a)

$$u_n = (-1)^{n-1} \frac{n+2}{n^2+1}$$

b)

$$u_n = (-1)^n \sin \frac{2}{n^2}$$

20.a)

$$u_n = (-1)^{n+1} \frac{\sin n}{n}$$

b)

$$u_n = (-1)^n \ln\left(1 + \frac{1}{n}\right)$$

21.a)

$$u_n = (-1)^n \frac{n+1}{n\sqrt{n}}$$

b)

$$u_n = (-1)^{n+1} \left(1 - \cos \frac{1}{n}\right)$$

22.a)

$$u_n = \frac{(-1)^n}{(n+1)\ln(n+1)}$$

b)

$$u_n = (-1)^{n-1} \operatorname{tg} \frac{3}{n+2}$$

23.a)

$$u_n = (-1)^{n+1} \frac{2n+3}{(3n+2)n}$$

b)

$$u_n = (-1)^n \sin \frac{1}{n+2}$$

24.a)

$$u_n = (-1)^{n-1} \sin \frac{1}{2^n}$$

b)

$$u_n = (-1)^n \frac{n+1}{n(n+2)}$$

25.a)

$$u_n = (-1)^n \frac{n+1}{n\sqrt{n}}$$

b)

$$u_n = \frac{(-1)^{n+1}}{n\ln(n+3)}$$

26.a)

$$u_n = (-1)^{n-1} \left(1 - \cos \frac{2}{n}\right),$$

b)

$$u_n = \frac{(-1)^n}{n \ln(n+1)}$$

27.a)

$$u_n = (-1)^n \operatorname{tg} \frac{3}{n+2},$$

b)

$$u_n = \frac{(-1)^{n+1}}{n \sqrt[3]{n+1}}$$

28.a)

$$u_n = (-1)^{n-1} \frac{n}{2^n},$$

b)

$$u_n = (-1)^n \sin \frac{1}{n+2}$$

29.a)

$$u_n = (-1)^n \sin \frac{1}{2^n},$$

b)

$$u_n = (-1)^{n-1} \frac{n+1}{n(n+2)}$$

30.a)

$$u_n = (-1)^{n+1} \frac{\sin n}{3^n},$$

b)

$$u_n = (-1)^n \frac{n}{(n+1)(n+2)}$$

23

11. Найти интервал сходимости степенного ряда и исследовать сходимость на концах интервала сходимости

1.a) $\sum_{n=1}^{\infty} \frac{x^n}{n^n}$

а) $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{(x-5)^n}{n \cdot 3^n}$

2.a) $\sum_{n=1}^{\infty} \frac{x^n}{n \cdot 2^n}$

б) $\sum_{n=1}^{\infty} 3^{n^2} x^{n^2}$

3.a) $\sum_{n=1}^{\infty} \frac{x^{2n-1}}{2n-1}$

в) $\sum_{n=1}^{\infty} \frac{(-1)^{n-1} x^n}{n}$

4.a) $\sum_{n=1}^{\infty} \frac{n! \cdot x^n}{n^n}$

г) $\sum_{n=1}^{\infty} \left(\frac{n}{2n+1}\right)^{2n-1} (x-1)^n$

5.a) $\sum_{n=1}^{\infty} \frac{x^n}{n!}$

д) $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^{2n-1}}{2n+1}$

6.a) $\sum_{n=1}^{\infty} \frac{1}{n} \cdot x^n$

е) $\sum_{n=1}^{\infty} \frac{(n-1)(x+3)^n}{3^{n+1}}$

7.a) $\sum_{n=1}^{\infty} \frac{x^n}{n(n+1)}$

ж) $\sum_{n=1}^{\infty} \frac{(-1)^n n(x-5)^n}{(n+1)!}$

8.a) $\sum_{n=1}^{\infty} \frac{\ln(n+1)}{n} x^n$

9) $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{(x-2)^{2n}}{n \cdot 4^n}$

9.a) $\sum_{n=1}^{\infty} \left(1 + \frac{1}{n}\right)^{n^2} x^n$

9) $\sum_{n=1}^{\infty} \frac{(x+1)^{3n-2}}{2^{3n} (n+1) \ln(n+1)}$

10.a) $\sum_{n=1}^{\infty} \left(1 + \frac{1}{n}\right)^{n^2} x^n$ ✓

9) $\sum_{n=1}^{\infty} \frac{(2n-1)^n (x+1)^n}{2^{n-1} n^n}$ ✓

11.a) $\sum_{n=2}^{\infty} \frac{2^{n-2} x^n}{n^2 - 1}$

9) $\sum_{n=0}^{\infty} \frac{(3n-2)(x-5)^n}{(n+1)^2 \cdot 2^{n+1}}$

12.a) $\sum_{n=1}^{\infty} \frac{x^n}{n \cdot 3^n}$

9) $\sum_{n=0}^{\infty} \frac{n! (x+3)^n}{n^n}$

13.a) $\sum_{n=1}^{\infty} \frac{2^{n-1} n! x^n}{(2n)!}$

9) $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{(x-5)^n}{n \cdot 3^n}$

14.a) $\sum_{n=1}^{\infty} \frac{x^n}{n^2}$

9) $\sum_{n=1}^{\infty} \frac{(x+1)^n}{(n+1) \ln^2(n+1)}$

15.a)
$$\sum_{n=2}^{\infty} (n-1) 3^{n-1} x^n;$$

b)
$$\sum_{n=1}^{\infty} \frac{x^{2n}}{5^n n^3}$$

16.a)
$$\sum_{n=0}^{\infty} (-4)^n x^n;$$

b)
$$\sum_{n=1}^{\infty} (-1)^n \frac{(x+1)^n}{n \cdot 2^n}$$

17.a)
$$\sum_{n=1}^{\infty} (-1)^n \frac{x^n}{(2n)!};$$

b)
$$\sum_{n=1}^{\infty} \frac{5^n}{n!} (x-2)^n$$

18.a)
$$\sum_{n=1}^{\infty} (-1)^n \frac{x^n}{(n+1)^2} e^n;$$

b)
$$\sum_{n=1}^{\infty} \frac{(x-2)^n}{\sqrt{n}}$$

19.a)
$$\sum_{n=2}^{\infty} \frac{x^n}{n \cdot 4^n \cdot \ln n};$$

b)
$$\sum_{n=1}^{\infty} \frac{n}{(n+1) \cdot 3^n} (x+4)^n$$

20.a)
$$\sum_{n=1}^{\infty} \left(\frac{n+1}{2n+1} \right)^n x^n;$$

b)
$$\sum_{n=1}^{\infty} \frac{(x-1)^n}{n^2}$$

21.a)
$$\sum_{n=0}^{\infty} \frac{x^n}{3^n (n+1)};$$

b)
$$\sum_{n=1}^{\infty} (-1)^n \frac{(x-3)^n}{2^n \sqrt{n}}$$

22.a)
$$\sum_{n=0}^{\infty} (-1)^n \frac{x^n}{5^n \sqrt{n+1}}$$

d)
$$\sum_{n=1}^{\infty} 10^{2n} x^{2n}$$

23.a)
$$\sum_{n=2}^{\infty} \frac{3^n x^n}{\sqrt{(3n-2) 2^n}}$$

e)
$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^{2n-1}}{2n-1}$$

24.a)
$$\sum_{n=1}^{\infty} \frac{n! x^n}{(n+1)^n}$$

f)
$$\sum_{n=1}^{\infty} \frac{(x-1)^n}{(2n+1) 2^n}$$

25.a)
$$\sum_{n=1}^{\infty} \frac{10^n x^n}{\sqrt{n}}$$

g)
$$\sum_{n=1}^{\infty} \frac{(2x+1)^n}{(3n-2)}$$

26.a)
$$\sum_{n=1}^{\infty} (-1)^n \frac{x^n}{3^{n-1} \sqrt{n}}$$

h)
$$\sum_{n=1}^{\infty} \frac{(x+8)^{3n}}{n^2}$$

27.a)
$$\sum_{n=0}^{\infty} (-2)^n x^{2n}$$

i)
$$\sum_{n=1}^{\infty} 10^{2n} (2x-3)^{2n-1}$$

28.a)
$$\sum_{n=1}^{\infty} \frac{(n!)^2 \cdot n}{(2n)!} x^n$$

j)
$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{(x-4)^{2n-1}}{2n-1}$$

29.a)
$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^n}{2^n n^2}$$

k)
$$\sum_{n=1}^{\infty} \frac{2^{3n} n x}{8^n}$$