

ТЕМА РЯДИ

10 Довести збіжність числового ряду та знайти його суму

1. $\sum_{n=0}^{\infty} \frac{1}{(2n+5)(2n+7)}$	2. $\sum_{n=1}^{\infty} \frac{5^n - 2^n}{10^n}$	3. $\sum_{n=1}^{\infty} \frac{3^n + 4^n}{12^n}$	4. $\sum_{n=1}^{\infty} \frac{2^n + 7^n}{14^n}$	5. $\sum_{n=0}^{\infty} \frac{1}{(n+2)(n+3)}$
6. $\sum_{n=1}^{\infty} \frac{1}{(n+6)(n+7)}$	7. $\sum_{n=1}^{\infty} \frac{7^n - 3^n}{21^n}$	8. $\sum_{n=1}^{\infty} \frac{1}{n(n+2)}$	9. $\sum_{n=1}^{\infty} \frac{7^n - 2^n}{14^n}$	10. $\sum_{n=1}^{\infty} \frac{1}{(3n+1)(3n+4)}$
11. $\sum_{n=1}^{\infty} \frac{1}{(2n+3)(2n+5)}$	12. $\sum_{n=1}^{\infty} \frac{1}{(n+9)(n+10)}$	13. $\sum_{n=1}^{\infty} \frac{1}{(3n+2)(3n+5)}$	14. $\sum_{n=1}^{\infty} \frac{4^n + 5^n}{20^n}$	15. $\sum_{n=1}^{\infty} \frac{1}{(n+7)(n+8)}$
16. $\sum_{n=0}^{\infty} \frac{1}{(2n+7)(2n+9)}$	17. $\sum_{n=0}^{\infty} \frac{1}{(2n+1)(2n+3)}$	18. $\sum_{n=1}^{\infty} \frac{5^n - 4^n}{20^n}$	19. $\sum_{n=1}^{\infty} \frac{4^n - 3^n}{12^n}$	20. $\sum_{n=1}^{\infty} \frac{1}{(3n-1)(3n+2)}$
21. $\sum_{n=1}^{\infty} \frac{2^n + 5^n}{10^n}$	22. $\sum_{n=0}^{\infty} \frac{1}{(n+5)(n+6)}$	23. $\sum_{n=0}^{\infty} \frac{1}{(n+3)(n+4)}$	24. $\sum_{n=1}^{\infty} \frac{9^n - 2^n}{18^n}$	25. $\sum_{n=1}^{\infty} \frac{1}{(n+4)(n+5)}$
26. $\sum_{n=1}^{\infty} \frac{5^n - 3^n}{15^n}$	27. $\sum_{n=1}^{\infty} \frac{3^n + 8^n}{24^n}$	28. $\sum_{n=1}^{\infty} \frac{3^n + 5^n}{15^n}$	29. $\sum_{n=1}^{\infty} \frac{7^n + 3^n}{21^n}$	30. $\sum_{n=1}^{\infty} \frac{8^n - 3^n}{24^n}$
31. $\sum_{n=1}^{\infty} \frac{1}{(n+7)(n+8)}$	32. $\sum_{n=1}^{\infty} \frac{4^n + 5^n}{20^n}$	33. $\sum_{n=1}^{\infty} \frac{1}{n(n+2)}$	34. $\sum_{n=1}^{\infty} \frac{1}{(2n+3)(2n+5)}$	35. $\sum_{n=1}^{\infty} \frac{4^n + 5^n}{20^n}$

11. Дослідити на збіжність числовий ряд

1. $\sum_{n=1}^{\infty} \frac{\sqrt{(n+1)^n}}{n!}$	2. $\sum_{n=1}^{\infty} \frac{3n-1}{\sqrt{n} \cdot 7^n}$	3. $\sum_{n=1}^{\infty} \frac{1 \cdot 7 \cdot 13 \dots (6n-5)}{2 \cdot 3 \cdot 4 \dots (n+1)}$	4. $\sum_{n=1}^{\infty} \left(\frac{9}{10}\right)^n n^7$	5. $\sum_{n=1}^{\infty} \frac{1 \cdot 5 \cdot 9 \dots (4n-3)}{1 \cdot 4 \cdot 7 \dots (3n-2)}$	6. $\sum_{n=1}^{\infty} \frac{n!}{5^n \cdot (n+3)!}$
7. $\sum_{n=1}^{\infty} \frac{3^n (n+2)!}{n^5}$	8. $\sum_{n=1}^{\infty} \frac{7^n - 1}{5^n (n+1)!}$	9. $\sum_{n=1}^{\infty} \frac{2 \cdot 5 \cdot 8 \dots (3n-1)}{3 \cdot 7 \cdot 11 \dots (4n-1)}$	10. $\sum_{n=1}^{\infty} \frac{\sqrt{n^n}}{3^n}$	11. $\sum_{n=1}^{\infty} \frac{(2n-1)^3}{(2n)!}$	12. $\sum_{n=1}^{\infty} \frac{n^n}{(n+1)!}$
13. $\sum_{n=1}^{\infty} \frac{n^n}{(n+3)!}$	14. $\sum_{n=1}^{\infty} \frac{(n^2+3)}{(n+1)!}$	15. $\sum_{n=1}^{\infty} \frac{1 \cdot 6 \cdot 11 \dots (5n-4)}{1 \cdot 3 \cdot 7 \dots (4n-1)}$	16. $\sum_{n=1}^{\infty} \frac{(n+2)!}{n^n}$	17. $\sum_{n=1}^{\infty} \frac{n}{(2n+3)!}$	18. $\sum_{n=1}^{\infty} \frac{2n+1}{\sqrt{n} 2^n}$
19. $\sum_{n=1}^{\infty} n \cdot \sin \frac{2\pi}{3^n}$	20. $\sum_{n=1}^{\infty} n^3 \operatorname{tg} \frac{2\pi}{5^n}$	21. $\sum_{n=1}^{\infty} \frac{1 \cdot 3 \cdot 5 \dots (2n-1)}{2 \cdot 7 \cdot 12 \dots (5n-3)}$	22. $\sum_{n=1}^{\infty} (2n+1) \cdot \operatorname{tg} \frac{\pi}{3^n}$	23. $\sum_{n=1}^{\infty} (3n-1) \cdot \sin \frac{\pi}{4^n}$	24. $\sum_{n=1}^{\infty} \frac{5^n}{4 \cdot n!}$
25. $\sum_{n=1}^{\infty} \frac{3n(n+1)}{5^n}$	26. $\sum_{n=1}^{\infty} \frac{n+2}{n!}$	27. $\sum_{n=1}^{\infty} \frac{4 \cdot 5 \cdot 6 \dots (n+1)}{5 \cdot 7 \cdot 9 \dots (2n+3)}$	28. $\sum_{n=1}^{\infty} \frac{(n+1)^n}{n!}$	29. $\sum_{n=1}^{\infty} \left(\frac{7}{8}\right)^n \left(\frac{1}{n}\right)^7$	30. $\sum_{n=1}^{\infty} \frac{2^n}{5^n (2n-1)}$
31. $\sum_{n=1}^{\infty} \frac{3^n (n+2)!}{n^5}$	32. $\sum_{n=1}^{\infty} \frac{3n-1}{\sqrt{n} \cdot 7^n}$	33. $\sum_{n=1}^{\infty} \frac{1 \cdot 6 \cdot 11 \dots (5n-4)}{1 \cdot 3 \cdot 7 \dots (4n-1)}$	34. $\sum_{n=1}^{\infty} \frac{\sqrt{n^n}}{3^n}$	35. $\sum_{n=1}^{\infty} \frac{n^n}{(n+1)!}$	36. $\sum_{n=1}^{\infty} \frac{(n^2+3)}{(n+1)!}$

12. Дослідити на збіжність числовий ряд

1. $\sum_{n=1}^{\infty} \left(\frac{2n-1}{2n}\right)^{n^2}$	2. $\sum_{n=1}^{\infty} 10^n \left(\frac{n+1}{n}\right)^n$	3. $\sum_{n=1}^{\infty} \left(\frac{n+1}{4n}\right)^{3n}$	4. $\sum_{n=1}^{\infty} \left(\frac{n}{3n+1}\right)^n$	5. $\sum_{n=1}^{\infty} \left(\arcsin \frac{1}{3n}\right)^{2n}$	6. $\sum_{n=1}^{\infty} \frac{10^n}{(\ln(n+5))^{2n}}$
7. $\sum_{n=1}^{\infty} \left(\arcsin \frac{1}{2^n}\right)^{3n}$	8. $\sum_{n=1}^{\infty} \left(\frac{5n-1}{5n}\right)^{n^2}$	9. $\sum_{n=1}^{\infty} \left(\sin \frac{\pi}{n^2}\right)^{2n}$	10. $\sum_{n=1}^{\infty} \left(\frac{3n-1}{3n}\right)^{n^2}$	11. $\sum_{n=1}^{\infty} \left(\operatorname{tg} \frac{\pi}{2n+1}\right)^n$	12. $\sum_{n=1}^{\infty} \left(\arcsin \frac{n+3}{2n+5}\right)^n$
13. $\sum_{n=1}^{\infty} \left(\operatorname{arctg} \frac{1}{2n+1}\right)^n$	14. $\sum_{n=1}^{\infty} \left(\frac{n}{n+1}\right)^{n^2}$	15. $\sum_{n=1}^{\infty} \left(\frac{3n^2+4n+5}{6n^2-4n-1}\right)^{n^2}$	16. $\sum_{n=1}^{\infty} \frac{1}{(\ln(n+1))^{2n}}$	17. $\sum_{n=1}^{\infty} \left(\frac{n+1}{2n}\right)^{n^2}$	18. $\sum_{n=1}^{\infty} \left(\operatorname{arctg} \frac{1}{2n+1}\right)^{2n}$
19. $\sum_{n=1}^{\infty} \left(\arcsin \frac{1}{3^n}\right)^n$	20. $\sum_{n=1}^{\infty} 4^n \left(\frac{n+1}{n}\right)^{n^2}$	21. $\sum_{n=1}^{\infty} \left(\frac{3n^2-n-1}{7n^2+3n+4}\right)^n$	22. $\sum_{n=1}^{\infty} \frac{1}{(\ln(n+1))^{3n}}$	23. $\sum_{n=1}^{\infty} \left(\frac{n+1}{2n}\right)^{5n}$	24. $\sum_{n=1}^{\infty} \left(\frac{n+1}{n}\right)^{n^2} 5^n$
25. $\sum_{n=1}^{\infty} \left(\operatorname{arctg} \frac{1}{5^n}\right)^n$	26. $\sum_{n=1}^{\infty} \left(\operatorname{tg} \frac{\pi}{5^n}\right)^{3n}$	27. $\sum_{n=1}^{\infty} \left(\frac{n^2+5n+8}{3n^2-2}\right)^n$	28. $\sum_{n=1}^{\infty} \frac{1}{(\ln(n+3))^n}$	29. $\sum_{n=1}^{\infty} \frac{1}{(\ln(n+2))^n}$	30. $\sum_{n=1}^{\infty} \left(\sin \frac{\pi}{5n+1}\right)^n$
31. $\sum_{n=1}^{\infty} \left(\frac{n+1}{2n}\right)^{n^2}$	32. $\sum_{n=1}^{\infty} \left(\frac{5n-1}{5n}\right)^{n^2}$	33. $\sum_{n=1}^{\infty} \left(\operatorname{arctg} \frac{1}{2n+1}\right)^n$	34. $\sum_{n=1}^{\infty} \frac{10^n}{(\ln(n+5))^{2n}}$	35. $\sum_{n=1}^{\infty} \left(\frac{5n-1}{5n}\right)^{n^2}$	36. $\sum_{n=1}^{\infty} \frac{1}{(\ln(n+1))^{3n}}$

13. Дослідити на збіжність умовну і абсолютну числовий ряд

1. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{n}{3n-1}$	2. $\sum_{n=1}^{\infty} (-1)^n \frac{1}{\sqrt[4]{n^5}}$	3. $\sum_{n=1}^{\infty} (-1)^n \frac{3}{\ln(n+1)}$	4. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{2n+1}$	5. $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{1}{(3n-2)}$
6. $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{1}{2n}$	7. $\sum_{n=1}^{\infty} (-1)^n \frac{1}{3n^2+1}$	8. $\sum_{n=1}^{\infty} (-1)^n \frac{1}{n\sqrt{n}}$	9. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{2n+1}{5n(n+1)}$	10. $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{1}{n!}$
11. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{(n+1)3^n}$	12. $\sum_{n=1}^{\infty} (-1)^n \frac{1}{(2n-1)3^n}$	13. $\sum_{n=0}^{\infty} \frac{(-1)^n}{\sqrt{2n+1}}$	14. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{3^n}{(2n+1)^n}$	15. $\sum_{n=1}^{\infty} (-1)^n n \ln\left(1 + \frac{1}{n^2}\right)$
16. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{n^2}$	17. $\sum_{n=1}^{\infty} (-1)^n \frac{n+5}{3^n}$	18. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{n(2n+1)}$	19. $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{1}{n5^n}$	20. $\sum_{n=1}^{\infty} (-1)^n \frac{n+5}{3^n}$
21. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{2n+1}{n(n+1)}$	22. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{\sqrt{n+1}}$	23. $\sum_{n=1}^{\infty} \frac{(-1)^n}{2n-1}$	24. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{2n+1}{n}$	25. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{\sqrt{n+5}}$
26. $\sum_{n=2}^{\infty} \frac{(-1)^{n+1}}{\ln n}$	27. $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n^3 \sqrt{n}}$	28. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{n}{6n+5}$	29. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{\sqrt{n}}$	30. $\sum_{n=1}^{\infty} (-1)^{n+1} \left(\frac{1}{2n+7}\right)^n$
31. $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{2n+1}{n(n+1)}$	32. $\sum_{n=1}^{\infty} (-1)^n \frac{n+5}{3^n}$	33. $\sum_{n=1}^{\infty} \frac{(-1)^n}{2n-1}$	34. $\sum_{n=1}^{\infty} (-1)^{n-1} \frac{1}{n5^n}$	35. $\sum_{n=1}^{\infty} (-1)^n \frac{n+5}{3^n}$

14	Задача 8. Розкласти функцію $f(x)$ у ряд Маклорена.		
1. $f(x) = \frac{1}{2x+5}$	2. $f(x) = \sin \frac{\pi x}{4}$	3. $f(x) = x^3 \arctg x$	4. $f(x) = \ln(5x+3)$
5. $f(x) = \cos x^3$	6. $f(x) = \frac{1}{x^2 - 4x + 3}$	7. $f(x) = \frac{1}{x+3}$	8. $f(x) = \frac{1}{x^2 - 2x + 2}$
9. $f(x) = x \cdot \cos \sqrt{x}$	10. $f(x) = 2^{-x^2}$	11. $f(x) = e^x$	12. $f(x) = \frac{x^2}{1+x^2}$
13. $f(x) = \ln(5x+3)$	14. $f(x) = \sin x^3$	15. $f(x) = \frac{1}{\sqrt{4+x}}$	16. $f(x) = \sin 5x$
17. $f(x) = e^{3x}$	18. $f(x) = x^3 \arctg 3x$	19. $f(x) = \frac{\sin 3x}{x}$	20. $f(x) = \sin x$
21. $f(x) = \operatorname{ch}(2x^3)$	22. $f(x) = \operatorname{sh} x$	23. $f(x) = \frac{1}{\sqrt{e^x}}$	24. $f(x) = \frac{2}{1-3x^2}$
25. $f(x) = \sin(x^2)$	26. $f(x) = \frac{1}{\sqrt{x-1}}$	27. $f(x) = \frac{1}{x+3}$	28. $f(x) = \cos 3x$
29. $f(x) = \frac{1}{(x-3)^2}$	30. $f(x) = \frac{1}{x}$	31. $f(x) = \cos 12x$	32. $f(x) = \frac{4}{1+x}$
33. $f(x) = \frac{\sin 7x}{x}$	34. $f(x) = e^{-x^2}$	35. $f(x) = 5^x$	36. $f(x) = 2^{-x^2}$