

ДОМАШНА РАБОТА №6

1) Изследвайте за сходимост числовия ред:

1.1. $\sum_{n=1}^{\infty} \frac{n \cdot 3^n}{2n+1}$;

1.2. $\sum_{n=1}^{\infty} \frac{n \cdot 2^n}{3n-2}$;

1.3. $\sum_{n=1}^{\infty} \frac{(n+1) \cdot 4^n}{5n-3}$;

1.4. $\sum_{n=1}^{\infty} \frac{n \cdot 3^{n+3}}{4n+1}$;

1.5. $\sum_{n=1}^{\infty} \frac{n+1}{(2n-1) \cdot 4^n}$;

1.6. $\sum_{n=1}^{\infty} \frac{n}{(3n+1) \cdot 2^n}$;

1.7. $\sum_{n=1}^{\infty} \frac{4n+1}{n \cdot 2^{n+2}}$;

1.8. $\sum_{n=1}^{\infty} \frac{5n-1}{(n+1) \cdot 5^{n+1}}$;

1.9. $\sum_{n=1}^{\infty} \frac{2n+5}{(n+5) \cdot 2^n}$;

1.10. $\sum_{n=1}^{\infty} \frac{(2n-1) \cdot 7^n}{3n+1}$.

2) Изследвайте за сходимост числовия ред:

2.1. $\sum_{n=1}^{\infty} \frac{8^n}{(n+1)!}$;

2.2. $\sum_{n=1}^{\infty} \frac{5^n}{(n+3)!}$;

2.3. $\sum_{n=1}^{\infty} \frac{3^{n+2}}{(n+6)!}$;

2.4. $\sum_{n=1}^{\infty} \frac{4^{n+2}}{(n+2)!}$;

2.5. $\sum_{n=1}^{\infty} \frac{n \cdot 2^n}{(n+7)!}$;

2.6. $\sum_{n=1}^{\infty} \frac{n \cdot 5^{n+1}}{(n+5)!}$;

2.7. $\sum_{n=1}^{\infty} \frac{(2n+1) \cdot 6^n}{(n+3)!}$;

2.8. $\sum_{n=1}^{\infty} \frac{(3n+2) \cdot 4^n}{(n+4)!}$;

2.9. $\sum_{n=1}^{\infty} \frac{(n+1)!}{(2n+3) \cdot 2^n}$;

2.10. $\sum_{n=1}^{\infty} \frac{n!}{(3n+1) \cdot 7^n}$.

3) Изследвайте за сходимост числовия ред:

3.1. $\sum_{n=1}^{\infty} \frac{3^n}{(2n+1)!}$;

3.2. $\sum_{n=1}^{\infty} \frac{2^{n+5}}{(2n+5)!}$;

3.3. $\sum_{n=1}^{\infty} \frac{(2n+7)!}{n \cdot 4^n}$;

3.4. $\sum_{n=1}^{\infty} \frac{(2n+3)!}{(n+1) \cdot 5^n}$;

3.5. $\sum_{n=1}^{\infty} \frac{(2n-1)!}{8^{n+1}}$;

3.6. $\sum_{n=1}^{\infty} \frac{(2n-3)!}{4^{n+3}}$;

3.7. $\sum_{n=1}^{\infty} \frac{7^{n+2}}{(3n+1)!}$;

3.8. $\sum_{n=1}^{\infty} \frac{2^n}{(3n+2)!}$;

3.9. $\sum_{n=1}^{\infty} \frac{n \cdot 5^n}{(2n-1)!}$;

3.10. $\sum_{n=1}^{\infty} \frac{(n+2) \cdot 9^n}{(2n+7)!}$.

4) Изследвайте за сходимост числовия ред:

$$4.1. \sum_{n=0}^{\infty} \frac{2^n \cdot n!}{2.5 \dots (3n+2)};$$

$$4.2. \sum_{n=0}^{\infty} \frac{3^n \cdot (n+2)!}{3.7 \dots (4n+3)};$$

$$4.3. \sum_{n=0}^{\infty} \frac{4^{n+1} \cdot n!}{5.7 \dots (2n+5)};$$

$$4.4. \sum_{n=0}^{\infty} \frac{7^{n+2} \cdot (n+3)!}{3.8 \dots (5n+3)};$$

$$4.5. \sum_{n=0}^{\infty} \frac{2^n \cdot (n+5)!}{4.7 \dots (3n+4)};$$

$$4.6. \sum_{n=0}^{\infty} \frac{6^{n+1} \cdot n!}{2.9 \dots (7n+2)};$$

$$4.7. \sum_{n=0}^{\infty} \frac{5.8 \dots (3n+5)}{5^n \cdot n!};$$

$$4.8. \sum_{n=0}^{\infty} \frac{3.5 \dots (2n+3)}{3^n \cdot (n+6)!};$$

$$4.9. \sum_{n=0}^{\infty} \frac{1.8 \dots (7n+1)}{8^{n+1} \cdot (n+2)!};$$

$$4.10. \sum_{n=0}^{\infty} \frac{5.9 \dots (4n+5)}{7^{n+3} \cdot n!}.$$

5) Изследвайте за сходимост числовия ред:

$$5.1. \sum_{n=0}^{\infty} \frac{1.8 \dots (7n+1)}{7^{n+1} \cdot (n+3)!};$$

$$5.2. \sum_{n=0}^{\infty} \frac{4.7 \dots (3n+4)}{3^n \cdot n!};$$

$$5.3. \sum_{n=0}^{\infty} \frac{5.9 \dots (4n+5)}{4^n \cdot (n+1)!};$$

$$5.4. \sum_{n=0}^{\infty} \frac{7.9 \dots (2n+7)}{2^n \cdot n!};$$

$$5.5. \sum_{n=0}^{\infty} \frac{1.5 \dots (4n+1)}{4^n \cdot n!};$$

$$5.6. \sum_{n=0}^{\infty} \frac{3.8 \dots (5n+3)}{5^n \cdot (n+5)!};$$

$$5.7. \sum_{n=0}^{\infty} \frac{4^n \cdot (n+1)!}{5.9 \dots (4n+5)};$$

$$5.8. \sum_{n=0}^{\infty} \frac{3^{n+1} \cdot (n+7)!}{2.5 \dots (3n+2)};$$

$$5.9. \sum_{n=0}^{\infty} \frac{5^n \cdot n!}{2.7 \dots (5n+2)};$$

$$5.10. \sum_{n=0}^{\infty} \frac{2^n \cdot (n+8)!}{4.6 \dots (2n+4)}.$$

6) Изследвайте за сходимост числовия ред:

$$6.1. \sum_{n=1}^{\infty} \frac{2^n \cdot n!}{(2n+1)!!};$$

$$6.2. \sum_{n=1}^{\infty} \frac{(2n)!!}{(2n+1)!!};$$

$$6.3. \sum_{n=1}^{\infty} \frac{2^{n+2} \cdot (n+3)!}{(2n+4)!!};$$

$$6.4. \sum_{n=1}^{\infty} \frac{(2n+6)!!}{(2n+3)!!};$$

$$6.5. \sum_{n=1}^{\infty} \frac{2^{n+3} \cdot n!}{(2n+5)!!};$$

$$6.6. \sum_{n=1}^{\infty} \frac{(2n+1)!!}{(2n+4)!!};$$

$$6.7. \sum_{n=1}^{\infty} \frac{(2n+3)!!}{2^n \cdot n!};$$

$$6.8. \sum_{n=1}^{\infty} \frac{(2n)!!}{(2n+1)!!} \cdot \frac{1}{2n+5};$$

$$6.9. \sum_{n=1}^{\infty} \frac{(2n)!!}{2^n \cdot (n+5)!};$$

$$6.10. \sum_{n=1}^{\infty} \frac{(2n+2)!!}{(2n+5)!!} \cdot \frac{1}{2n+1}.$$

7) Изследвайте за сходимост числовия ред:

$$7.1. \sum_{n=1}^{\infty} \frac{3^n \cdot (n!)^2}{(2n+1)!};$$

$$7.2. \sum_{n=1}^{\infty} \frac{2^n \cdot (n!)^2}{(2n-1)!};$$

$$7.3. \sum_{n=1}^{\infty} \frac{5^n \cdot ((n+1)!)^2}{(2n-1)!};$$

$$7.4. \sum_{n=1}^{\infty} \frac{2^n \cdot ((n+2)!)^2}{(2n+1)!};$$

$$7.5. \sum_{n=1}^{\infty} \frac{(2n+3)!}{7^{n+1} \cdot (n!)^2};$$

$$7.6. \sum_{n=1}^{\infty} \frac{(2n+6)!}{2^{n+3} \cdot (n!)^2};$$

$$7.7. \sum_{n=1}^{\infty} \frac{(2n+5)!}{6^{n+1} \cdot ((n+1)!)^2};$$

$$7.8. \sum_{n=1}^{\infty} \frac{(2n+3)!}{2^{n+1} \cdot ((n+3)!)^2};$$

$$7.9. \sum_{n=1}^{\infty} \frac{(2n+2)!}{4^n \cdot ((n+2)!)^2};$$

$$7.10. \sum_{n=1}^{\infty} \frac{(2n+4)!}{2^n \cdot ((n+3)!)^2}.$$

8) Изследвайте за сходимост числовия ред:

$$8.1. \sum_{n=1}^{\infty} \left(\frac{2n+3}{3n+5} \right)^n;$$

$$8.2. \sum_{n=1}^{\infty} \left(\frac{3n+1}{n+7} \right)^n;$$

$$8.3. \sum_{n=1}^{\infty} \left(\frac{4n+3}{3n+5} \right)^{2n};$$

$$8.4. \sum_{n=1}^{\infty} \left(\frac{2n+1}{3n+2} \right)^{3n};$$

$$8.5. \sum_{n=1}^{\infty} \frac{(2n+3)^n}{(5n-2)^n};$$

$$8.6. \sum_{n=1}^{\infty} \frac{(4n-2)^n}{(3n+1)^n};$$

$$8.7. \sum_{n=1}^{\infty} \frac{(6n-5)^{2n}}{(2n+3)^{2n}};$$

$$8.8. \sum_{n=1}^{\infty} \frac{(n+3)^{3n}}{(2n-1)^{3n}};$$

$$8.9. \sum_{n=1}^{\infty} \frac{(7n+1)^n}{(n+2)^{2n}};$$

$$8.10. \sum_{n=1}^{\infty} \frac{(2n+1)^{3n}}{(5n+4)^n}.$$

9) Изследвайте за сходимост числовия ред:

$$9.1. \sum_{n=1}^{\infty} \left(\frac{n+1}{n} \right)^{n^2};$$

$$9.2. \sum_{n=1}^{\infty} \left(\frac{n-1}{n} \right)^{n^2};$$

$$9.3. \sum_{n=1}^{\infty} \left(\frac{n+2}{n} \right)^{n^2};$$

$$9.4. \sum_{n=1}^{\infty} \left(\frac{n-2}{n} \right)^{n^2};$$

$$9.5. \sum_{n=1}^{\infty} \left(\frac{n+3}{n+2} \right)^{n^2};$$

$$9.6. \sum_{n=1}^{\infty} \left(\frac{n+4}{n+3} \right)^{n^2};$$

$$9.7. \sum_{n=1}^{\infty} \left(\frac{n+5}{n+1} \right)^{n^2};$$

$$9.8. \sum_{n=1}^{\infty} \left(\frac{n+2}{n+3} \right)^{n^2};$$

$$9.9. \sum_{n=1}^{\infty} \left(\frac{2n+3}{2n+2} \right)^{n^2};$$

$$9.10. \sum_{n=1}^{\infty} \left(\frac{2n+4}{2n+5} \right)^{n^2}.$$

10) Определете радиуса и интервала на сходимост на степенния ред:

$$10.1. \sum_{n=0}^{\infty} \frac{2^n}{3n+5} \cdot x^n;$$

$$10.2. \sum_{n=0}^{\infty} \frac{(-3)^n}{2n+7} \cdot x^n;$$

$$10.3. \sum_{n=0}^{\infty} \frac{4^n}{2n+3} \cdot x^n;$$

$$10.4. \sum_{n=0}^{\infty} \frac{(-4)^n}{4n+3} \cdot x^n;$$

$$10.5. \sum_{n=0}^{\infty} \frac{(3x)^n}{4n+5};$$

$$10.6. \sum_{n=0}^{\infty} \frac{(-2x)^n}{3n+1};$$

$$10.7. \sum_{n=0}^{\infty} \frac{(5x)^n}{2n+9};$$

$$10.8. \sum_{n=0}^{\infty} \frac{(-5x)^n}{5n+2};$$

$$10.9. \sum_{n=0}^{\infty} \frac{x^n}{4n+1};$$

$$10.10. \sum_{n=0}^{\infty} \frac{(-x)^n}{6n+5}.$$

11) Определете радиуса и интервала на сходимост на степенния ред:

$$11.1. \sum_{n=0}^{\infty} \frac{1}{3^n(n+5)} \cdot x^n;$$

$$11.2. \sum_{n=0}^{\infty} \frac{1}{(-5)^n(4n+1)} \cdot x^n;$$

$$11.3. \sum_{n=0}^{\infty} \frac{x^n}{2^n(3n+2)};$$

$$11.4. \sum_{n=0}^{\infty} \frac{x^n}{(-2)^n(n+1)};$$

$$11.5. \sum_{n=0}^{\infty} \frac{x^n}{5^n(3n+5)};$$

$$11.6. \sum_{n=0}^{\infty} \frac{x^n}{(-4)^n(2n+8)};$$

$$11.7. \sum_{n=0}^{\infty} \frac{3^n}{4^n(4n+1)} \cdot x^n;$$

$$11.8. \sum_{n=0}^{\infty} \frac{(-5)^n}{2^n(5n+2)} \cdot x^n;$$

$$11.9. \sum_{n=0}^{\infty} \frac{(7x)^n}{3^n(6n+5)};$$

$$11.10. \sum_{n=0}^{\infty} \frac{(-3x)^n}{5^n(4n+3)}.$$

12) Определете радиуса и интервала на сходимост на степенния ред:

$$12.1. \sum_{n=0}^{\infty} \frac{5^n}{n^2+n+2} \cdot x^n;$$

$$12.2. \sum_{n=0}^{\infty} \frac{(-3)^n}{n^2-n+5} \cdot x^n;$$

$$12.3. \sum_{n=0}^{\infty} \frac{(4x)^n}{n^2+1};$$

$$12.4. \sum_{n=0}^{\infty} \frac{(-4x)^n}{n^2+6};$$

$$12.5. \sum_{n=0}^{\infty} \frac{x^n}{n^2+n};$$

$$12.6. \sum_{n=0}^{\infty} \frac{(-x)^n}{n^2+2n};$$

$$12.7. \sum_{n=0}^{\infty} \frac{x^n}{3^n(n^2+4)};$$

$$12.8. \sum_{n=0}^{\infty} \frac{x^n}{(-4)^n(n^2+3)};$$

$$12.9. \sum_{n=0}^{\infty} \frac{3^n}{4^n(n^2+n)} \cdot x^n;$$

$$12.10. \sum_{n=0}^{\infty} \frac{(-3x)^n}{3^n(n^2+2)}.$$

13) Определете радиуса и интервала на сходимост на степенния ред:

$$13.1. \sum_{n=0}^{\infty} \frac{4^n}{(n+5)!} \cdot x^n;$$

$$13.2. \sum_{n=0}^{\infty} \frac{(-5)^n}{(n+7)!} \cdot x^n;$$

$$13.3. \sum_{n=0}^{\infty} \frac{3^{n+2}}{(n+1)!} \cdot x^n;$$

$$13.4. \sum_{n=0}^{\infty} \frac{(-4)^{n+3}}{(n+5)!} \cdot x^n;$$

$$13.5. \sum_{n=0}^{\infty} \frac{(2x)^n}{n!};$$

$$13.6. \sum_{n=0}^{\infty} \frac{(-5x)^n}{n!};$$

$$13.7. \sum_{n=0}^{\infty} \frac{(n+3)!}{3^n} \cdot x^n;$$

$$13.8. \sum_{n=0}^{\infty} \frac{(n+2)!}{(-2)^n} \cdot x^n;$$

$$13.9. \sum_{n=0}^{\infty} \frac{(n)!}{7^{n+2}} \cdot x^n;$$

$$13.10. \sum_{n=0}^{\infty} \frac{(n)!}{7^{n+2}} \cdot x^n.$$