1. Na podstawie kilku początkowych wyrazów ciągu ustalić jego wzór ogólny

1. $(a_n) = (1, 4, 7, 10, \dots)$ 2. $(a_n) = (8, -4\sqrt{2}, 4, -2\sqrt{2}, \dots)$ 3. $(a_n) = (0, 1, 0, -1, 0, 1, -1, \dots)$

2. Dla podanych ciągów napisać wzory określające wskazane wyrazy ciągów

1. $a_n = \sqrt[n]{n^2+1},\ a_{n+1}$ 2. $a_n = \frac{1}{(2n)!},\ a_{3n+2}$ 3. $a_n = 3^n + 3^{n+1} + \dots 3^{2n},\ a_{n^2}$

3. Zbadać ograniczoność ciągów

1. $a_n = \sqrt{n+3} - \sqrt{n+5}$ 2. $a_n = \frac{3n+\sin n^2}{4n-\cos n!}$ 3. $a_n = \frac{1}{n^2+1} + \frac{1}{n^2+2} + \dots + \frac{1}{n^2+n}$

4. Zbadać czy podane ciągi są monotoniczne od pewnego miejsca

1. $a_n = n^2 - 49n - 50$ 2. $a_n = \frac{n+2}{n+5}$ 3. $a_n = \frac{2^n+1}{3^n+1}$

5. Oblicz granice ciągów

1. $a_n = \dfrac{n^3+2n^2+n+5}{2n^3+n^2+3n+1}$ 2. $a_n = \dfrac{(n+2)(n^2+3n+1)}{(3n^3+2n^2+5n+1)}$ 3. $a_n = \dfrac{(n^2+5n+1)^3(n+3)^4}{(n^2+3n+1)^5}$

4. $a_n = \dfrac{(2n^3+n^2+1)^2(n^2+1)^3}{(n^3+3n+1)^4}$ 5. $a_n = \dfrac{n^4+3n^2+4n+1}{n^3+3n^2+n+1}$ 6. $a_n = \dfrac{(n^2+3n+5)^3(n^2+n+5)}{(n+2)^2(n-1)}$

7. $a_n = \dfrac{n^3+3n^2+5n+1}{n^4+2n^3+n+5}$ 8. $a_n = \dfrac{(4n^2+2n+2)^3}{(n^3+3n^2+n+4)^3}$ 9. $a_n = \dfrac{\sqrt{9n^2+3n+1}}{n+5}$

10. $a_n = \dfrac{n^2+5n+1}{\sqrt[3]{8n^6+n^2+3}}$ 11. $a_n = \sqrt{\dfrac{3n^2+n+1}{n^2+5n+1}}$ 12. $a_n = \dfrac{\sqrt{n^2-1}}{\sqrt[3]{n^3+1}}$

13. $a_n = \dfrac{(n+2)!+(n+1)!}{(n+2)!-(n+1)!}$ 14. $a_n = \dfrac{\binom{n+2}{n}}{n^2}$ 15. $a_n = \frac{1}{n}\binom{n}{1} + \frac{2}{n^2}\binom{n}{2} + \frac{1}{n^3}\binom{n}{3}$

16. $a_n = \dfrac{1+3+5+\dots+(2n-1)}{2n^2+3n+2}$ 17. $a_n = \dfrac{1-2+3-\dots-2n}{3n^2+4n+5}$ 18. $a_n = \dfrac{1+\frac{1}{2}+\frac{1}{4}+\dots+\frac{1}{2^n}}{\frac{1}{3}+\frac{1}{9}+\dots+\frac{1}{3^n}}$

19. $a_n = \dfrac{2^n+3^{n+2}}{4\cdot 3^{n+1}+2^{n-2}}$ 20. $a_n = \dfrac{5\cdot 5^{2n+1}-3\cdot 4^{2n+1}}{25^{n+1}+16^{n+3}}$ 21. $a_n = \dfrac{3\cdot 2^{3n+2}+4^{2n+1}}{3^{2n+1}+5\cdot 5^{n-3}}$

6. Oblicz granice ciągów

1. $a_n = (\sqrt{n^2+2n+2} - \sqrt{n^2+3n+1})$ 2. $a_n = (3n - \sqrt{9n^2+5n+1})$ 3. $a_n = (2n - \sqrt{4n^2+4n+6})$

4. $a_n = (\sqrt[3]{n^3+2n^2} - \sqrt[3]{n^3+2n+1})$ 5. $a_n = (\sqrt{2n^2+4n+5} - \sqrt{2}n)$ 6. $a_n = (\sqrt{2n^2+2} - \sqrt{n^2+3n})$

7. Oblicz granice ciągów

1. $a_n = \sqrt[n]{2\cdot 3^n + 5\cdot 7^n}$ 2. $a_n = \sqrt[n]{5n^2+\cos n}$ 3. $a_n = \sqrt[n]{\frac{(-1)}{n}+2n}$

4. $a_n = \frac{1}{n^2+1} + \frac{2}{n^2+2} + \dots + \frac{n}{n^2+n}$ 5. $a_n = n(\frac{1}{n^2+1} + \frac{1}{n^2+2} + \dots + \frac{1}{n^2+n})$ 6. $a_n = (-1)^{n+3}\frac{n+1}{n^2+2n+3}$

7. $a_n = \dfrac{\sin(n!+2)}{n^2+3n+1}$ 8. $a_n = \dfrac{3n+\sin n}{4n-\cos(n^2+1)}$ 9. $a_n = \dfrac{[n]+3n}{n^2+2n+5}$

8. Oblicz granice ciągów

1. $a_n = \left(1 - \frac{1}{n}\right)^n$
2. $a_n = \left(\frac{3n+1}{3n-1}\right)^{n+3}$
3. $a_n = \left(\frac{2n+2}{2n+4}\right)^{3n+1}$
4. $a_n = \left(\frac{n^2+1}{n^2}\right)^{\binom{n}{2}}$
5. $a_n = \left(\frac{4n-2}{4n+1}\right)^{3n-1}$
6. $a_n = \left(\frac{n^2+3}{n^2+1}\right)^{2n^2+5}$

9. Oblicz granice ciągów

1. $a_n = \dfrac{\log_2 n^5}{\log_8 n}$
2. $a_n = \dfrac{9^{\log_3 n}}{4^{\log_2 n}}$
3. $a_n = \dfrac{8^{\log_2 n}}{2^n}$
4. $a_n = \dfrac{27^{\log_3 n}}{16^{\log_2 n}}$
5. $a_n = \dfrac{n!}{n^n}$
6. $a_n = \dfrac{2^n \cdot 3^{2n}}{n!}$
7. $a_n = \left(1 - \frac{1}{2^2}\right)\left(1 - \frac{1}{3^2}\right)\ldots\left(1 - \frac{1}{n^2}\right)$