

851. Obliczyć granicę

$$\lim_{n \rightarrow \infty} \left(\frac{n}{\sqrt{n^4+n}} + \frac{n+1}{\sqrt{n^4+n+1}} + \frac{n+2}{\sqrt{n^4+n+2}} + \frac{n+3}{\sqrt{n^4+n+3}} + \dots + \frac{9n}{\sqrt{n^4+9n}} \right).$$

852. Obliczyć granicę

$$\lim_{n \rightarrow \infty} \left(\frac{4n^2}{n^3} + \frac{4n^2+n}{n^3+1} + \frac{4n^2+2n}{n^3+2} + \frac{4n^2+3n}{n^3+3} + \frac{4n^2+4n}{n^3+4} + \dots + \frac{9n^2-n}{n^3+5n-1} + \frac{9n^2}{n^3+5n} \right).$$

853. Obliczyć granicę

$$\lim_{n \rightarrow \infty} \left(\frac{\binom{n}{0}}{\sqrt{4^n+1}} + \frac{\binom{n}{1}}{\sqrt{4^n+3}} + \frac{\binom{n}{2}}{\sqrt{4^n+9}} + \frac{\binom{n}{3}}{\sqrt{4^n+27}} + \dots + \frac{\binom{n}{n-1}}{\sqrt{4^n+3^{n-1}}} + \frac{\binom{n}{n}}{\sqrt{4^n+3^n}} \right).$$

854. Obliczyć granicę

$$\lim_{n \rightarrow \infty} \frac{\sqrt{n^2+1} + \sqrt{4n^2+1} + \sqrt{9n^2+1} + \sqrt{16n^2+1} + \sqrt{25n^2+1} + \sqrt{36n^2+1} + \dots + \sqrt{n^4+1}}{n^k}$$

dla tak dobranej wartości naturalnej parametru k , aby granica ta była liczbą rzeczywistą dodatnią.

855. Obliczyć granicę

$$\lim_{n \rightarrow \infty} \frac{\sqrt{1+2} + \sqrt{16+16} + \sqrt{2^8+2^7} + \sqrt{2^{12}+2^{10}} + \sqrt{2^{16}+2^{13}} + \dots + \sqrt{2^{4n}+2^{3n+1}}}{4^n+1}.$$

856. Obliczyć granicę

$$\lim_{n \rightarrow \infty} \left(\frac{\sqrt{1+1}}{\sqrt{n^{24}+1}} + \frac{\sqrt{1+2^6}}{\sqrt{n^{24}+2^6}} + \frac{\sqrt{1+3^6}}{\sqrt{n^{24}+3^6}} + \dots + \frac{\sqrt{1+k^6}}{\sqrt{n^{24}+k^6}} + \dots + \frac{\sqrt{1+n^{18}}}{\sqrt{n^{24}+n^{18}}} \right).$$

Wskazówka-przypomnienie: $1^3 + 2^3 + 3^3 + \dots + n^3 = \frac{n^2 \cdot (n+1)^2}{4}.$

857. Obliczyć granicę

$$\lim_{n \rightarrow \infty} \left(\frac{2^n}{\sqrt{9^n+5^n}} + \frac{2^{n-1} \cdot 3}{\sqrt{9^n+5^{n-1} \cdot 7}} + \frac{2^{n-2} \cdot 3^2}{\sqrt{9^n+5^{n-2} \cdot 7^2}} + \dots + \frac{2^{n-k} \cdot 3^k}{\sqrt{9^n+5^{n-k} \cdot 7^k}} + \dots + \frac{3^n}{\sqrt{9^n+7^n}} \right).$$

858. Obliczyć granicę

$$\lim_{n \rightarrow \infty} \left(\frac{4^n}{4^n+2^n} + \frac{4^n}{4^{n+1}+2^{n+1}} + \frac{4^n}{4^{n+2}+2^{n+2}} + \dots + \frac{4^n}{4^{n+k}+2^{n+k}} + \dots + \frac{4^n}{16^n+4^n} \right).$$

859. Obliczyć granicę

$$\lim_{n \rightarrow \infty} \left(\frac{\sqrt{1+2}}{\sqrt{n^{12}+1}} + \frac{\sqrt{16+8}}{\sqrt{n^{12}+2^5}} + \frac{\sqrt{81+18}}{\sqrt{n^{12}+3^5}} + \dots + \frac{\sqrt{k^4+2k^2}}{\sqrt{n^{12}+k^5}} + \dots + \frac{\sqrt{n^8+2n^4}}{\sqrt{n^{12}+n^{10}}} \right).$$

Wskazówka-przypomnienie: $1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n \cdot (n+1) \cdot (2n+1)}{6}.$