

1. Find a formula for the general term a_n of the sequence $\left\{ \frac{1}{5}, \frac{3}{8}, \frac{5}{11}, \frac{7}{14}, \dots \right\}$
2. Find a formula for the general term a_n of the sequence $\left\{ \frac{1}{6}, \frac{1}{18}, \frac{1}{54}, \frac{1}{162}, \dots \right\}$
3. Find a formula for the general term a_n of the sequence $\left\{ \frac{3}{2}, -\frac{5}{4}, \frac{7}{8}, -\frac{9}{16}, \frac{11}{32}, \dots \right\}$
4. Evaluate $\lim_{n \rightarrow \infty} (-1)^n \cos\left(\frac{1}{n}\right)$
5. Evaluate $\lim_{n \rightarrow \infty} \frac{\ln n}{n}$
6. Evaluate $\lim_{n \rightarrow \infty} \cos\left(\frac{\pi}{n}\right)$
7. Evaluate $\lim_{n \rightarrow \infty} \sqrt{n} \sin \frac{\pi}{\sqrt{n}}$
8. Evaluate $\lim_{n \rightarrow \infty} \sin \frac{\pi}{\sqrt{n}}$
9. Evaluate $\lim_{n \rightarrow \infty} \cos n\pi$
10. Evaluate $\lim_{n \rightarrow \infty} \frac{n!}{2^n}$
11. Evaluate $\lim_{n \rightarrow \infty} \frac{n^2 + 2}{n^3}$
12. Evaluate $\lim_{n \rightarrow \infty} \left(1 - \frac{5}{n}\right)^n$
13. Evaluate $\lim_{n \rightarrow \infty} \frac{\sqrt{n^5 + 2n^3 + 5}}{n^3}$
14. Evaluate $\lim_{n \rightarrow \infty} \frac{n!}{n^n}$
15. Show $\lim_{n \rightarrow \infty} r^n = 0$ if $0 < r < 1$.
16. Show the sequence $\left\{ \sqrt{2}, \sqrt{2\sqrt{2}}, \sqrt{2\sqrt{2\sqrt{2}}}, \dots \right\}$ is bounded and increasing. Find the limit.

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17. A sequence $\{a_n\}$ is defined by $a_1 = 1$ and $a_{n+1} = 4 - \frac{1}{a_n}$. Assuming that the sequence converges, find its limit.
18. A sequence $\{a_n\}$ is defined by $a_1 = \sqrt{2}$ and $a_{n+1} = \sqrt{2 + a_n}$ for $n \geq 1$. Assuming that the sequence is convergent, find its limit.