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1. Determine which of the following series is divergent and explain why.
a) $\sum_{n=1}^{\infty} \frac{n+1}{2 n-1}$
b) $\sum_{n=1}^{\infty} \frac{3^{n}}{n^{3}}$
c) $\sum_{n=1}^{\infty} \frac{2^{n}}{100}$
d) $\sum_{n=1}^{\infty}\left(1+\frac{k}{n}\right)^{n}$
e) $\sum_{n=1}^{\infty}\left(\frac{n}{n+3}\right)^{-2 n}$.
2. For each of the following series, find the sum of the convergent series.
(a) $\sum_{n=1}^{\infty}\left[(0.7)^{n}+(0.9)^{n}\right]$
(b) $4-2+1-\frac{1}{2}+\ldots$
(c) $\sum_{n=0}^{\infty} \frac{(-2)^{n+1}}{3^{n}}$
3. Find the values of $x$ for which the series converges, and find the sum of the series for those values of $x$.
(a) $\sum_{n=0}^{\infty} \frac{(4 x-1)^{n}}{5^{n}}$
(b) $\sum_{n=0}^{\infty}(\cos x)^{n}$
4. Express the repeating decimal as a geometric series and write its sum as the ratio of two integers.
(a) 0.21515515515...
(b) 1.8181818181818181818...
5. Use the Integral test to determine the convergence or divergence of the series:
(a) $\sum_{n=1}^{\infty}(n)^{k}(e)^{-n}$
(b) $\sum_{n=1}^{\infty} \frac{1}{n^{1 / 3}}$
(c) $\sum_{n=1}^{\infty} \frac{1}{n^{\pi}}$
(d) $\sum_{n=2}^{\infty} \frac{\ln n}{n^{3}}$
