

1. For each of the following problems determine if the sequence is increasing, decreasing, not monotonic, bounded below, bounded above and/or bounded.

(a) $\left\{\frac{1}{n^3+1}\right\}_{n=1}^{\infty}$

(b) $\{\sin(n)\}_{n=1}^{\infty}$

(c) $\{(1-n)e^n\}_{n=1}^{\infty}$

2. Determine if the following series converge or diverge

(a) $\sum_{n=0}^{\infty} \frac{n^3}{n^4+1}$

(b) $\sum_{n=0}^{\infty} \frac{3^n+n}{2^{n+1}}$

(c) $\sum_{n=2}^{\infty} \frac{(-1)^n(n+1)}{n^2+1}$

(d) $\sum_{n=0}^{\infty} \frac{(2n-1)!}{(3n)!}$

(e) $\sum_{n=1}^{\infty} \frac{\ln(n^2)}{n}$

3. Find the Taylor expansion of each of the following functions about c . Expand to three terms.

(a) $f(x) = \ln(1-x)$ about $x = -2$

(b) $f(x) = e^{1-8x}$ about $x = 3$