

MTH 253
Mini Test 4

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- (7) 1. Determine whether the series converges absolutely, converges conditionally, or diverges. Justify your conclusion as specifically as possible.

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

2. Consider the series $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{\sqrt[5]{n^8}}$.

- (2) (a) Show that the series converges.
(1) (b) Approximate the sum of the series with s_4 .
(3) (c) Determine the number of terms needed to estimate the sum with an error of at most 0.001.
(6) 3. Find the radius of convergence and the interval of convergence for the power series

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

- (6) 4. Find the Taylor series for $f(x) = \sin 3x$ centered at $a = \frac{\pi}{6}$. Write your conclusion in sigma notation, and show all work that leads to your conclusion.