

Math 31B Practice Problems I

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1. Determine whether the series is convergent or divergent. State what test(s) you used to come to your conclusion.

$$(a) \sum_{n=1}^{\infty} \frac{1 + \sin n}{10^n}$$

$$(c) \sum_{n=1}^{\infty} \frac{(-10)^n}{n!}$$

$$(e) \sum_{n=1}^{\infty} \left(\frac{n^2 + 1}{2n^2 + 1} \right)^n$$

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

$$(b) \sum_{n=1}^{\infty} \frac{(-1)^n n}{10^n}$$

$$(d) \sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n \ln n}$$

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

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

2. Find the Taylor polynomial T_4 of $f(x) = \frac{1}{x}$ about $a = -1$.

3. Find $(f^{-1})'(2)$ where $f(x) = x^3 + 3 \sin x + 2 \cos x$.

4. Evaluate the following:

$$(a) \int \frac{\tan^{-1}(x)}{1 + x^2} dx$$

$$(c) \int \frac{1}{\sqrt{5 - 2x^2}} dx$$

$$(e) \int \frac{1}{x^2 - 16} dx$$

$$(b) \int \frac{1}{4 + x^2} dx$$

$$(d) \int \frac{10}{(x - 1)(x^2 + 9)} dx$$

$$(f) \int \frac{1}{(x + 5)^2(x - 1)} dx$$