

Serial No.: _____ Student Name: _____ Student Number: _____

Instructor: M. Z. Abu-Sbeih

Math 102- Q4

Date: 18-5-2009

Show all your work. No credits for answers not supported by work. Name any test you use.1. Determine whether the sequence converges or diverges.

(a) $a_n = \frac{(-3)^n}{n!}$

(b) $b_n = \ln(n+1) - \ln n$

2. For what values of x does the series converge? $\sum_{n=1}^{\infty} \frac{x^n}{3^n}$ 3. Determine whether the series converges or diverges.

(a) $\sum_{n=1}^{\infty} \tan^{-1} n$

(b) $\sum_{n=1}^{\infty} n e^{-n^2}$

(c) $1 + \frac{1}{4\sqrt{2}} + \frac{1}{9\sqrt{3}} + \frac{1}{16\sqrt{4}} + \frac{1}{25\sqrt{5}} + \dots$

4. Consider the series $\sum_{n=1}^{\infty} \frac{1}{n^2 + n}$

(a) Find the sum of the series.

(b) If we use the first 10 terms to approximate the sum, estimate the error in this approximation.

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Show all your work. No credits for answers not supported by work. Name any test you use.1. Determine whether the sequence converges or diverges.

(a) $a_n = \frac{(-2)^n}{n!}$

(b) $b_n = \sqrt{n+1} - \sqrt{n}$

2. For what values of x does the series converge? $\sum_{n=1}^{\infty} \frac{x^n}{2^n}$ 3. Determine whether the series converges or diverges.

(a) $\sum_{n=1}^{\infty} \arctan n$

(b) $\sum_{n=1}^{\infty} n^2 e^{-n^3}$

(c) $1 + \frac{\sqrt{2}}{4} + \frac{\sqrt{3}}{9} + \frac{\sqrt{4}}{16} + \frac{\sqrt{5}}{25} + \dots$

4. Consider the series $\sum_{n=1}^{\infty} \frac{1}{n + n^2}$

(c) Find the sum of the series.

(d) If we use the first 10 terms to approximate the sum, estimate the error in this approximation.