

Mathematics 1120H – Calculus II: Integrals and Series

TRENT UNIVERSITY, Winter 2024

Assignment #9

Convergent or Divergent?

Due* just before midnight on Friday, 22 March.

1. For each of the following series, determine whether it converges or diverges. If it converges, find or approximate the sum as best you can.

a. $\sum_{n=0}^{\infty} \frac{3^n}{n!}$ [1]

b. $\sum_{n=0}^{\infty} \frac{(-1)^n 3^n}{n!}$ [1]

c. $\sum_{n=0}^{\infty} \frac{n^n}{n!}$ [0.5]

d. $\sum_{n=0}^{\infty} \frac{(-1)^n n^n}{n!}$ [0.5]

e. $\sum_{n=0}^{\infty} \frac{3^n}{n^n}$ [1]

f. $\sum_{n=0}^{\infty} \frac{(-1)^n 3^n}{n^n}$ [1]

g. $\sum_{n=0}^{\infty} \frac{n!}{3^n}$ [0.5]

h. $\sum_{n=0}^{\infty} \frac{n!}{(-1)^n 3^n}$ [0.5]

i. $\sum_{n=0}^{\infty} \frac{n!}{n^n}$ [1]

j. $\sum_{n=0}^{\infty} \frac{(-1)^n n!}{n^n}$ [1]

k. $\sum_{n=0}^{\infty} \frac{n^n}{3^n}$ [0.5]

l. $\sum_{n=0}^{\infty} \frac{(-1)^n n^n}{3^n}$ [0.5]

2. Does the series $\sum_{n=0}^{\infty} \left[\frac{1}{3n+1} - \frac{1}{3n+2} + \frac{1}{3n+3} \right] = 1 - \frac{1}{2} + \frac{1}{3} + \frac{1}{4} - \frac{1}{5} + \frac{1}{6} + \dots$ converge or diverge? If it converges, does it do so conditionally or absolutely? [1]

* You should submit your solutions via Blackboard's Assignments module, preferably as a single pdf. If submission via Blackboard fails, please submit your work to your instructor by email or on paper.