Math 101 – WORKSHEET 24 SERIES

1. Review: Geometric and telescoping series

(1) Decide whether the following series converge or diverge (a) $\sum_{n=5}^{\infty} \frac{\pi^{2n+3}}{9^{n-2}}$

(b)
$$\sum_{n=5}^{\infty} \frac{e^{2n+2}}{9^{n-2}}$$

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

- 2. Skill 1: elements of a convergent series
- (2) Show the following series diverge (a) $\sum_{n=1}^{\infty} (-1)^n$
 - (b) $\sum_{n=0}^{\infty} n^2 \sin(n)$

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

Date: 8/3/2017, Worksheet by Lior Silberman. This instructional material is excluded from the terms of UBC Policy 81.

3. Review of improper integrals

(3) Show the following series diverge Show that $\int_2^\infty \frac{\mathrm{d}x}{x}$ diverges.

(3) Show that $\int_2^\infty \frac{\mathrm{d}x}{x^3+5}$ converges.

(4) Evaluate $\int_0^\infty x e^{-x} \, \mathrm{d}x$.

4. Skill 2: The Integral test

(6) Decide whether the following series converge or diverge.
(a) ∑_{n=1}[∞] 1/n
(b) ∑_{n=1}[∞] 1/n^p (your answer will depend on p).