

The University of Calgary
Department of Mathematics and Statistics
MATH 349
Handout # 3

1. Is the series $\sum_{n=3}^{\infty} \frac{(-1)^n}{n(\ln n)}$

- (a) absolutely convergent or divergent? Explain.
- (b) conditionally convergent or divergent? Explain.

2. Is the series $\sum_{n=1}^{\infty} \frac{(-1)^n}{\ln(n+1)}$

- (a) absolutely convergent or divergent? Explain.
- (b) conditionally convergent or divergent? Explain.

3. Is the series $\sum_{n=2}^{\infty} (-1)^n \left(\frac{1}{n} - \frac{1}{n!}\right)$

- (a) absolutely convergent or divergent? Explain.
- (b) conditionally convergent or divergent?

4. Find the centre, radius and interval of convergence of power series

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

(b) $\sum_{n=1}^{\infty} \frac{n!}{(2n)!} (2x-1)^n$

5. Express $f(x) = \frac{1}{(x+1)^2}$ in powers of $(x-1)$

On what interval is the representation valid?

6. Find the centre, radius and interval of convergence of power series

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

(b) $\sum_{n=1}^{\infty} \frac{n}{2^n} (4-x)^n$

7. Express $f(x) = \ln(2-x)$ in powers of $(x+1)$.

On what interval is the representation valid?

8. Expand $g(x) = \frac{1}{1-2x}$ in powers of $(x+4)$,

find the formula for n th term, and find the interval where the expansion is valid.