

University of Bahrain
Department of Mathematics
MATHS122: Calculus II
Spring 2016
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Worksheet 9: Series

Students' Name: _____

1. Determine whether the following series converge or diverges. If it the series converges, then find its value.

1. $\sum_{n=1}^{\infty} 7(-3)^{n-1}$

2. $\frac{1}{4} + \frac{1}{16} + \frac{1}{64} + \dots$

$$3. \sum_{n=2}^{\infty} \frac{3}{5^{n-1}}$$

$$4. \sum_{n=0}^{\infty} \frac{e^n}{3^n}$$

$$5. 10 - 2 + 0.4 - 0.08 + 0.0016 + \dots$$

$$6. \sum_{n=2}^{\infty} \frac{1}{n^2 - 1}$$

$$7. \sum_{n=1}^{\infty} \ln \left(1 + \frac{1}{n} \right)$$

$$8. \sum_{n=1}^{\infty} a_n \text{ if } a_1 = 1 \text{ and } a_n = (5 - n)a_{n-1}$$

2. Find the exact value of the following decimal numbers

(a) $0.\bar{2}$

(b) $7.\overline{1234}$

(c) $0.\bar{9}$ (Any weird result here?)

3. Let $\{a_n\}$ be a sequence and $\{S_n\}$ be its partial sum.
1. Write S_n in terms of a_i 's.
 2. What is the relation between S_n , S_{n-1} , and a_n ?
 3. If the series converges, what can you conclude about $\lim_{n \rightarrow \infty} a_n$?
(This is called the n th test for the converges of series).
4. Let $S_n = \frac{n}{n+1}$. Find a_n and $\sum_{n=1}^{\infty} a_n$.