University of Ruhuna
Department of Mathematics

Bachelor of Science (General) Degree (Level II)
Industrial Mathematics
IMT 2b2β: Mathematical Computing

Assignment No: 02 **Semester I, 2012**

---

1. Write down expressions for followings.

(i) $\displaystyle\sum_{i=1}^{10} i^3$

(ii) $\displaystyle\sum_{i=1}^{10} t_i$

(iii) $\displaystyle\sum_{i=1}^{10} t(i)$

(iv) $\displaystyle\sum_{i=0}^{n} (2^i + i^2)$

(v) $\displaystyle\sum_{i=1}^{\infty} 1/3^i$

(vi) $\displaystyle\sum_{i=1}^{\infty} 1/n$

(vii) $\displaystyle\sum_{i=1}^{\infty} 1/n^2$

(viii) $\displaystyle\sum_{i=1}^{\infty} 1/n^{1/2}$

---

2. (a) What are the conditions for convergence and divergence of geometric series.

(b) Identify the convergence series from the geometric series given below.

(c) For convergence series find out the convergence values.

(i) $\displaystyle\sum_{n=0}^{\infty} 2\left(\frac{1}{\sqrt{2}}\right)^n$

(ii) $\displaystyle\sum_{n=0}^{\infty} \left(\frac{2}{\sqrt{2}}\right)^n$

(iii) $\displaystyle\sum_{n=5}^{\infty} 3\left(\frac{2}{3}\right)^n$

(iv) $\displaystyle\sum_{n=1}^{\infty} 5\left(\frac{2^{n+1}}{3^n}\right)$

---

3. p-series is another type of series that may converge or diverge dependent upon the value of the parameter p. The p-series has the form $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^p}$. This series converges if $p > 1$, and diverges otherwise. Try $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^p}$ for $p = 1/2, 1/5, 1, 2, 3$.

---

4. Compute $\sum_{i=1}^{n}(a_i b_{n-i+1} - a_{n-i+1} b_i)$ for $n = 10, 10^2, 10^3, 10^4, 10^5, 10^6$.

---

5. Write down expressions for followings.

(i) $\prod_{i=1}^{5}(x + i(i+1)/2)$

(ii) $\prod_{i=1}^{10} t_i$

(iii) $\prod_{i=1}^{10} t(i)$

(iv) $\prod_{k=1}^{n} k$

(v) $\prod_{k=1}^{\infty} k$

(vi) $\prod_{k=1}^{n}(1/k)$

(vii) $\prod_{k=1}^{\infty} 1/k$

(viii) $\prod_{i=1}^{10} i^2$

---

6. (i) Use **product** function to find the factorial value of 10.

(ii) Write down expression for n! using the function **product**.

(iii) Try above expression with command **simpproduct**.

****