College of Engineering Pune
Department of Mathematics
MA 19003: Univariate Calculus
Tutorial on Unit III

(1) Which of the following sequences converge and which diverge? Find the limit of each convergent sequence and justify your answers.

(a) $a_n = (-1)^n(1 - \frac{1}{n})$ (e) $a_n = \frac{n}{n^{\frac{1}{n}}}$ (j) $a_n = (n+4)^{\frac{1}{n+4}}$

(b) $a_n = \frac{n+(-1)^n}{n}$ (f) $a_n = \sin(\frac{pi}{2} + \frac{1}{n})$ (k) $a_n = \sqrt[n]{4^n n}$

(c) $a_n = \frac{n^2}{e^n}$ (g) $a_n = npi\cos(npi)$ (l) $a_n = \ln n - \ln(n+1)$

(d) $a_n = (\frac{3n+1}{3n-1})^n$ (h) $a_n = \tan^{-1} n$ (m) $a_n = \frac{n!}{10^{6n}}$

$1 \quad 2 \quad 3 \quad \begin{bmatrix} 1 & 2 & 3 \\ a & b & c \end{bmatrix} \quad \begin{Bmatrix} 1 & 2 & 3 \\ a & b & c \end{Bmatrix} \quad \begin{vmatrix} 1 & 2 & 3 \\ a & b & c \end{vmatrix} \quad \begin{Vmatrix} 1 & 2 & 3 \\ a & b & c \end{Vmatrix}$
$a \quad b \quad c$