

Student Name -

Student Number -

Values

- 12 1. Determine whether the following series converge or diverge. Justify your answers. If a series converges, find its sum.

(a)  $\sum_{n=2}^{\infty} \frac{2^{2n+3}}{5^{n+1}}$

(b)  $\sum_{n=1}^{\infty} \frac{n-4}{10n+5}$

- 13 2. Find the interval of convergence for the power series

$$\sum_{n=1}^{\infty} \frac{2^n}{n+1} x^{2n+2}.$$

- 11 3. Use Taylor's remainder formula to verify that the Maclaurin series for  $e^{-2x}$  converges to  $e^{-2x}$  for  $x \leq 0$ .

- 6 4. Is it possible for the Maclaurin series for a function  $f(x)$  to converge at  $x = 5$ , but not at  $x = 4$ ? Explain.

- 8 5. Determine whether the sequence of functions

$$\left\{ \frac{n^2 x^2 + 3n^2 x + n}{2n^2 x + 5nx + 4} \right\}$$

has a limit as  $n \rightarrow \infty$ . If the sequence has a limit, find it; if the sequence does not have a limit, indicate why not. Do this on the following intervals:

(a)  $x \geq 1$

(b)  $-1 < x < 1$