MATH2132 Test 2 **October 24, 2013** **60 minutes**

Student Name - **Student Number -**

Values

15 **1.** Find the interval of convergence for the power series

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{2^{n+1}n}(x+1)^{3n+1}.$$

Justify all statements.

15 **2.** Find, if possible, the Maclaurin series for the function

$$f(x) = \frac{x+5}{(4-x)^2}.$$

If the series exists, derive it with a method that guarantees that the series converges to the function. Express your answer in sigma notation, simplified as much as possible. What is the interval of convergence of the series? If the series does not exist, explain why not.

5 **3.** Find, if possible, the Taylor series for the function

$$f(x) = (x-5)\ln(4-2x)$$

about $x = 5$. If the series exists, derive it with a method that guarantees that the series converges to the function. Express your answer in sigma notation, simplified as much as possible. What is the radius of convergence of the series? If the series does not exist, explain why not.

15 **4.** Find the sum of the series $\displaystyle\sum_{n=2}^{\infty} \frac{(-1)^n(n+1)}{n!}x^{n-1}$.