Instructions

1. There are four questions on this page. Do any three, and only upload the three that you wished marked.

2. Each question is worth 14 marks.

3. You have 60 minutes to complete the test and 10 minutes to upload your solutions.

4. Upload the honesty declaration as the solution to Question 5.

1. Find the interval of convergence for the power series

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

2. Find the Taylor series about $x = 2$ for the function

$$\frac{1}{\sqrt{4+3x}}.$$

Write your answer in sigma notation simplified as much as possible. You must use a method that guarantees that the series converges to the function. What is the open interval of convergence for the series?

3. Find the sum of the series

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

4. Approximate the value of the integral

$$\int_0^1 \frac{x - \sin x}{x^3} dx$$

accurate to four decimal places. Justify any conclusions that you make.