

Books, watches, notes or cell phones are **not** allowed. The **only** calculators allowed are the Sharp EL-531**. You **must** show all your work, the correct answer is worth 1 mark the remaining marks are given for the work.

Question 1. (4 marks) Evaluate the definite integral.

$$\int_0^4 \frac{x}{\sqrt{1+2x}} dx$$

Question 2. (3 marks) If a and b are positive numbers, show that

$$\int_0^1 x^a(1-x)^b dx = \int_0^1 x^b(1-x)^a dx$$

Question 3. (4 marks) Evaluate the integral

$$\int \cos(\ln x) dx$$

Question 4. (3 marks) If $f(0) = g(0) = 0$ and f'' and g'' are continuous, show that

$$\int_0^a f(x)g''(x) dx = f(a)g'(a) - f'(a)g(a) + \int_0^a f''(x)g(x) dx$$