Name:_____

Student Number:_____

Show all your work and give reasons for your answers. Good luck!

(1) Evaluate the following integrals:

(a) $\int \frac{x^5-\sqrt{x}}{x^7}\,dx$

(b) $\int_0^{\pi} x^3 \sin(x^4)\,dx$

(c) $\int \sin^3(x)\cos^2(x)\,dx$

(d) $\int x^2 \sin(x)\,dx$

(2) State the definition of the definite integral $\int_a^b f(x)\,dx$.

(3) Use the midpoint rule to estimate the value of $\ln(3) = \int_1^3 \frac{1}{x}\,dx$.
   (a) Using a partition with 4 intervals ($n = 4$).

   (b) How many intervals should you use if you want to have an error that is less than 10^{-5}?

(4) Evaluate $\int \frac{\sin(\sqrt{x})}{\sqrt{x}}\, dx$.

(5) Evaluate $\int \frac{2x+1}{x^3+x}\, dx$

(6) Evaluate $\int \frac{\sqrt{x}}{1+\sqrt[4]{x}}\,dx$.