Name:________________________

Student Number:________________________

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

# Part I

In part I essentially no partial credit is awarded. Hence work these problems carefully. Each problem in part I is 9 points.
In 1-6, evaluate the integrals:

(1) $\int \frac{x^7 - x}{\sqrt[3]{x}}\, dx$

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

(3) $\int x^3 (2x^4+1)^{30}\, dx$

(4) $\int \frac{1}{x^2-1}\, dx$

(5) $\int_0^1 \arctan(x)\,dx$

(6) $\int \sin^3(x)\cos^7(x)\,dx$

(7) Use a Riemann sum with $n = 3$ terms and the mid-point rule to estimate the value of $\int_3^4 \sin(x^3)\,dx$. (You do not need to evaluate the sine of a number and can leave your answer as a sum.)

(8) Given $F(x) = \int_1^{x^2} \sqrt{1+t^2}\,dt$, find $F'(x)$.

# Part II

In part II you can receive partial credit. Each problem in Part II counts for 14 points.

Evaluate the following integrals:

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

(10) $\int \cos^4(x)\,dx$

## Bonus problem

(11) $\int \frac{x}{\sqrt{x}(x+1)}\, dx$

Name:________________________

Student Number:________________________

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

# Part I

In part I essentially no partial credit is awarded. Hence work these problems carefully. Each problem in part I is 9 points.

(1) $\int \sqrt[3]{x}(x^5+1)\,dx$

(2) $\int xe^x\,dx$

(3) $\int \frac{x^4}{(3x^5+6)^{30}}\,dx$

(4) $\int \frac{1}{(x+1)(x-2)}\,dx$

(5) $\int_0^{1/2} \arcsin(x)\, dx$

(6) $\int \sin^7(x) \cos^3(x)\, dx$

(7) Use a Riemann sum with $n = 3$ terms and the mid-point rule to estimate the value of $\int_5^6 \tan(x^4)\, dx$. (You do not need to evaluate the tangent of a number and you can leave your answer as a sum.)

(8) Given $F(x) = \int_2^{x^4} \sin(1 + t^2)\, dt$, find $F'(x)$.

# Part II

In part II you can receive partial credit. Each problem in Part II counts for 14 points.

Evaluate the following integrals:

(9) $\int \frac{1}{x^3+x}\,dx$

(10) $\int \sin^4(x)\,dx$

## Bonus Problem

(11) $\int \sin(\sqrt{x})\, dx$