

Name: \_\_\_\_\_  
Student ID: \_\_\_\_\_

## Test 2

This test is graded out of 43 marks. No books, notes, no graphing calculator or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

**Question 1.** (3 marks)

Integrate the following indefinite integral:

$$\int t + \frac{1}{t} + \frac{1}{t^2} dt$$

**Question 2.** (5 marks)

Integrate the following indefinite integral:

$$\int \sec^6 4x \tan 4x dx$$

**Question 3.** (3 marks)

Integrate the following definite integral:

$$\int_1^4 \frac{x}{(1-x^2)^{\frac{2}{3}}} dx$$

**Question 4.** (3 marks)

Integrate the following definite integral:

$$\int_1^4 \frac{u-2}{\sqrt{u}} du$$

**Question 5.** Sketch (2 marks) and area (2 marks)

Sketch the graph of the algebraic function  $f(x) = x^2 + 2x + 1$  and  $g(x) = 3x + 3$  then find the area bounded by the two functions.

**Question 6.** (5 marks)

Integrate the following indefinite integral:

$$\int \frac{x^2}{x-1} dx$$

**Question 7.** (5 marks)

Integrate the following indefinite integral:

$$\int e^x \sin x dx$$

**Question 8.** (5 marks)

Integrate the following indefinite integral:

$$\int \sin^2 x \cos^2 x \, dx$$

**Question 9.** (5 marks)

Integrate the following indefinite integral:

$$\int \frac{9x^3}{\sqrt{1+x^2}} \, dx$$

**Question 10.** (5 marks)

Integrate the following indefinite integral:

$$\int \frac{2x^2 + 5x + 1}{x^3 + 2x^2 + x} dx$$

**Bonus Question.** (3 marks)

Integrate the following indefinite intergral:

$$\int \frac{1}{2t \cos^2 t + t - t \cos 2t} dt$$