Carlingford High School

2019

Advanced Mathematics

Year 12 Assessment Task Three

Time allowed 50 min

Student number……

General Instructions

- Do not write in columns
- Marks may be deducted for careless or badly arranged work
- Only calculators approved by the Board of Studies may be used
- All answers are to be completed in black pen except graphs and diagrams
- No lending or borrowing

Q1 Integration	**Q2** Logarithmic and Exponentials Functions	**Total**
/15	/13	/28

Answer all questions, starting each page with your ***student number*** and ***question number*** at the top of the page.

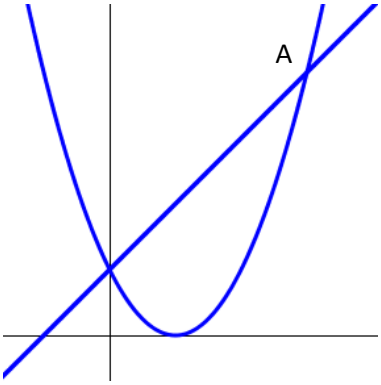
Question 1 (15 marks)

a. Find $\int \left(5x^2 - \frac{1}{x^2}\right) dx$ 2

b. Find $\int 4\sqrt{5x+7}dx$ 2

c. Find the area between the curve $y = (x-1)^3$, the *x-axis* and the lines $x = 2 \; and \; x = 0$ 3

d. The graphs of $y = x+1 \;\; and \;\; y = x^2 - 2x + 1$ are shown



i. Find the coordinates of point A 2

ii. Find the area bound by the two functions 2

e. Consider the function

$$y = \sqrt{4 - x^2}$$

i. Copy and complete the following table in surd form. 2

x	0	0.5	1	1.5	2
y					

ii. Apply Simpson's rule with 5 function values to find an approximation for 2

$\int_0^2 \sqrt{4 - x^2}$, correct to 3 decimal places.

Answer all questions, starting each page with your ***student number*** and ***question number*** at the top of the page.

Question 2 (13 marks)

a. Solve for x 2

i. $log_a(4x) - log_a 3 = log_a(x+4)$

ii. Differentiate $ln(5x-1)$ 1

b. i. Find $\int e^{5-2x}\, dx$ 1

ii. Evaluate $\int_0^1 \frac{6x\, dx}{x^2+1}$, leave in exact value. 2

c. The region beneath the curve $y = e^{-x}$ which is above the x axis and between the lines $x = 0\ and\ x = 1$ is rotated about the *x-axis.*

i. Sketch the region. 1

ii. Find the volume of the resulting solid of revolution 3

d. If $y = e^{2x} + e^{4x}$, show that $\frac{d^2y}{dx^2} - 6\frac{dy}{dx} + 8y = 0.$ 3