KINGSWAY CHRISTIAN COLLEGE

MATHS DEPARTMENT

Course: Math Methods unit 3

Assessment Task: Test 3

Student Name: _____

Date: 11th & 12th May 2017

Assessment Score: _____ / 71

Year Score: _____

Comments: _____

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Teacher signature: _____

Parent/ Guardian signature: _____

Comments: _____

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Math Methods Unit 3 Test 3 2017
Anti - Differentiation

Resource Free **Time: 50 minutes** **Marks: / 46**

Only a formula sheet is allowed for this section. No calculator or notes allowed.

Question 1 **(12 marks)**

Evaluate each of the following, showing all working. Leave all answers with positive indices.

(a) $\int \frac{4}{t^2} dt$ (1 mark)

(b) $\int 3x\left(x^2-2\right)^3 dx$ (3 marks)

(c) $\int\left(e^{-5x}+2\pi x-\sqrt{x}\right) dx$ (3 marks)

(d) $\frac{d}{dx}\left(\int_{-3}^{x^2}\frac{\sqrt{2t-3}}{t+1}dt\right)$ (2 marks)

END OF PAPER 1

EXTRA PAGE FOR WORK OUT

If it is given that $f(x)$ is continuous everywhere and that $\int_4^{10} f(x)dx=-10$, find:

(e) $\int_1^3 f(3x+1)dx$ (3 marks)

Question 2 **(15 marks)**

Evaluate the following, showing full working.

(a) $\int_1^2 (x^2-1)dx$ (3 marks)

(b) $-3\int_{\pi}^{2\pi}\cos(3x)dx$ (3 marks)

(c) $\int_1^3 \left(-e^{4x}+2\right) dx$ (3 marks)

Question 7 **(6 marks)**

The gradient function of $f(x)$ is given by $f'(x)=ax^2+b$. Determine the values of a and b if $f'(-2)=28,\ f(0)=1$ and $f(1)=7$.

(d) $\frac{d}{dx}\int_4^{x^2} \frac{2}{3t^3-1} dt$ (3 marks)

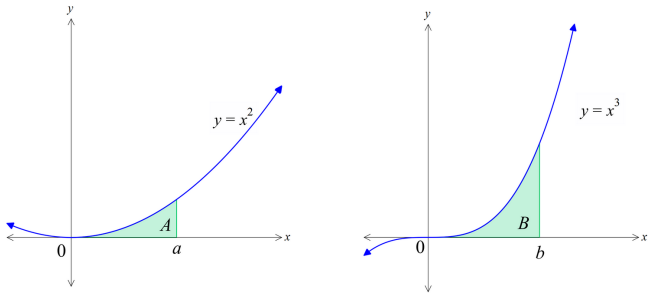
(e) $\int_1^2 \frac{d}{dx}\left(\frac{x^3}{x^2+1}\right) dx$ (3 marks)

Question 3 **(3 marks)**

The derivative of $f(x)$ is given by $f'(x) = 2e^{2x} + 3x^2$. Given that $f(1) = 4 + e^2$, find an expression for $f(x)$.

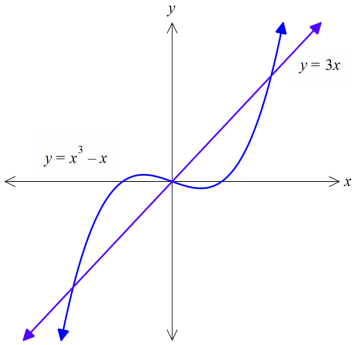
Question 4 **(3 marks)**

The area labelled *B* is two times the area labelled *A*. Express *b* in terms of *a*.



Question 5 **(3 marks)**

Find the exact area bound by the two curves shown below.



Question 6 **(4 marks)**

Determine the function *y* given that $\frac{d^2y}{dx^2} = 3e^x + 2$ and $\frac{dy}{dx} = 5$ when $x = 0$ and $y = 3e^2 + 15$ when $x = 2$.