Integration - Practice test 1

Name: _____ Date: _____

10 questions | 41 marks | 70 minutes

A balanced first paper: rules, interpretation, area and motion.

A scientific calculator may be used.

1. Antiderivatives. [4 marks]

(a) Find $\int(8x^3 - 6x + 5)\,dx$. [2 marks]

(b) Differentiate your answer to check. [2 marks]

2. Linear inputs. [4 marks]

(a) Find $\int 3e^{2x}\,dx$. [2 marks]

(b) Find $\int 4\cos(2x)\,dx$. [2 marks]

3. A reciprocal expression. [4 marks]

(a) Find $\int \frac{6}{3x+2}\,dx$. [2 marks]

(b) Evaluate $\int_0^1 \frac{6}{3x+2}\,dx$. [2 marks]

4. $f'(x) = 3x^2 + 2$ and $f(1) = 6$. [4 marks]

(a) Find $f(x)$. [2 marks]

(b) Find $f(2)$. [2 marks]

5. Definite-integral structure. [4 marks]

(a) Evaluate $\int_1^3 (2x + 1)\,dx$. [2 marks]

(b) Hence find $\int_3^1 (6x + 3)\,dx$. [2 marks]

6. The speed samples shown are used to estimate distance. [4 marks]

Speed recorded at equally spaced times.

Time (s)	0	1	2	3
Speed (m/s)	0	2	3	6

(a) Apply the trapezium rule. [2 marks]

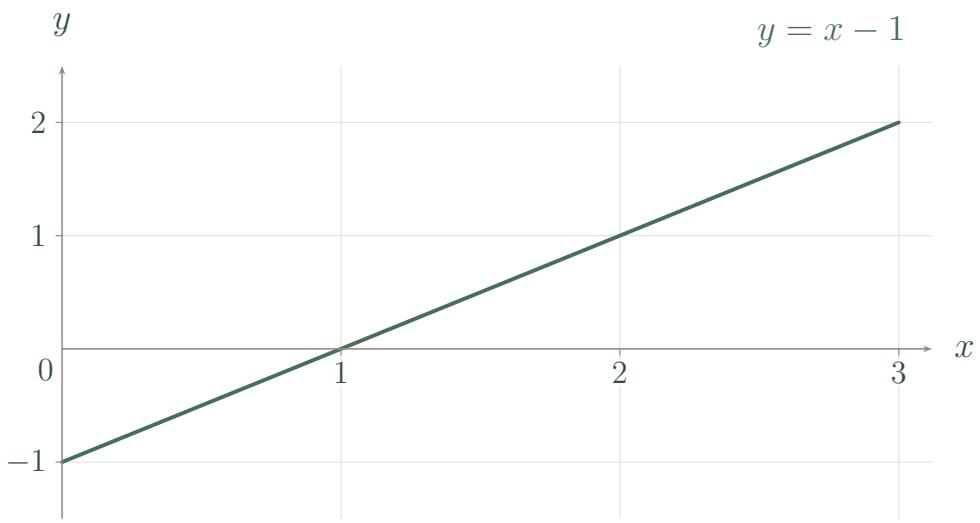
(b) Explain one assumption behind this estimate. [2 marks]

7. $A(x) = \int_0^{2x} (t^2 + 1)\,dt$. [4 marks]

(a) Find $A'(x)$ without evaluating the integral. [2 marks]

(b) Find $A(0)$ and interpret it. [2 marks]

8. The graph shows $y = x - 1$ on $[0, 3]$. [4 marks]



(a) Find the signed integral. [2 marks]

(b) Find the geometric area. [2 marks]

9. The curves $y = x^2$ and $y = 2x$ enclose a region. [4 marks]

(a) Find the intersection points. [2 marks]

(b) Find the enclosed area. [2 marks]

10. A particle has $v(t) = t - 2$ m/s on $0 \leq t \leq 5$ and initial position 4 m. [5 marks]

(a) Find its final position. [2 marks]

(b) Find its total distance. [3 marks]