Website: contoureducation.com.au | **Phone:** 1800 888 300
Email: hello@contoureducation.com.au

VCE Mathematical Methods ¾
Antidifferentiation [4.1]
Test

34 Marks. 1 Minute Reading. 23 Minutes Writing.

Results:

Test Questions	_____ / 23
Extension Questions	_____ / 11

Section A: Test Questions (23 Marks)

Question 1 (4 marks)

Tick whether the following statements are **true** or **false**.

Statement	True	False
a. If $F(x)$ is an antiderivative of $f(x)$, then $F(x) + c$ is also an antiderivative of $f(x)$.		
b. The integral of x^n is $\frac{x^{n+1}}{n+1} + c$.		
c. The reverse chain rule method of integration works for all factorised expressions.		
d. The definite integral of a function gives the change in the value of the antiderivative function over a given interval.		
e. If $F(x)$ is an antiderivative of $f(x)$, then $\int_a^b -f(x)\,dx = F(b) - F(a)$.		
f. The integral of $\frac{1}{x}$ is always $\log_e(x) + c$.		
g. If $\int_0^a f(x)\,dx = b$, then $\int_0^{2a} f\left(\frac{x}{2}\right) dx$ dilates the change in the antiderivative by a factor of $\frac{1}{2}$.		
h. The definite integral of a sine function over an interval of one period is zero.		

Space for Personal Notes

Question 2 (6 marks)

Evaluate each of the following integrals:

a. $\int \frac{1}{2}x^3 + 2x^2 - 3x \ dx$. (2 marks)

b. $\int \frac{1}{2x+5} - 3 \ dx$. (2 marks)

c. $\int \frac{1}{2}\sin(5 - 2x) + \frac{1}{e^{2x}} \ dx$. (2 marks)

Space for Personal Notes

Question 3 (3 marks)

Find the rule of the antiderivative function of $y = 5e^{x+1} - 2x^2$ given that the antiderivative passes through the points $\left(-1, \frac{22}{3}\right)$.

Space for Personal Notes

Question 4 (5 marks)

Evaluate each of the following definite integrals:

a. $\int_{-6}^{-5} \cos\left(\pi x + \frac{\pi}{4}\right) - \frac{1}{x+3}\, dx$. (2 marks)

b. $\int_{1}^{3} \frac{2}{e^{\frac{x}{2}-4}} + \frac{x^3}{4} - 2\, dx$. (3 marks)

Space for Personal Notes

Question 5 (5 marks)

Given that $\int_0^1 f(x)\,dx = 4$ and $\int_0^{-3} f(x)\,dx = -9$, evaluate:

a. $\int_1^{-3} 2f(x) - 1\,dx$. (2 marks)

b. $\frac{1}{2}\int_{-3}^{3} f\left(\frac{x-3}{2}\right) + 3\,dx$. (3 marks)

Space for Personal Notes

Section B: Extension Questions (11 Marks)

Question 6 (2 marks)

If

$$\int \frac{m - ax^n + 2x}{bx} dx = \frac{3}{2}\log_e(x) - 2x^3 + x + c$$

Determine the values of a, b, n and m.

Space for Personal Notes

Question 7 (4 marks)

a. Find the derivative with respect to x, of $\log_e\big(f(x)\big)$. (1 mark)

b. Hence, evaluate the integral. (3 marks).

$$\int_1^3 \frac{6-4x}{2x^2-6x-3}\,dx$$

Space for Personal Notes

Question 8 (5 marks)

a. Differentiate $y = \log_e(\cos(3x))$. (1 mark).

b. A function f is such that $f'(x) = \tan(3x)$ and $f\left(\frac{2\pi}{3}\right) = 3$. Find a possible rule for $f(x)$. (4 marks)

Space for Personal Notes

CONTOUREDUCATION

Website: contoureducation.com.au | **Phone:** 1800 888 300 | **Email:** hello@contoureducation.com.au

VCE Mathematical Methods ¾

Free 1-on-1 Support

Be Sure to Make The Most of These (Free) Services!

- Experienced Contour tutors (45 + raw scores, 99 + ATARs).
- For fully enrolled Contour students with up-to-date fees.
- After school weekdays and all-day weekends.

1-on-1 Video Consults	Text-Based Support
Book via bit.ly/contour-methods-consult-2025 (or QR code below). One active booking at a time (must attend before booking the next).	Message +61 440 138 726 with questions. Save the contact as "Contour Methods".

Booking Link for Consults
bit.ly/contour-methods-consult-2025

Number for Text-Based Support
+61 440 138 726