definate integrals

1. Evaluate $\int_1^2 \left(x^2 + \frac{1}{x} \right)^2 dx$. **5**

Part	Marks	Level	Calc.	Content	Answer	U2 OC2
	5	C	NC	C12, C13, C15		1998 P1 Q12

- $\bullet^1$ know to expand brackets
- $\bullet^2$ $x^4 + 2x + x^{-2}$
- $\bullet^3$ $\frac{1}{5}x^5 + x^2$
- $\bullet^4$ $-\frac{1}{x}$
- $\bullet^5$ $9\frac{7}{10}$

2. Find the value of $\int_1^2 \frac{u^2 + 2}{2u^2} du$. **5**

Part	Marks	Level	Calc.	Content	Answer	U2 OC2
	4	C	NC	C15		1989 P1 Q16
	1	A/B	NC	C15		

- $\bullet^1$ strat: know to divide
- $\bullet^2$ $\frac{1}{2} + u^{-2}$
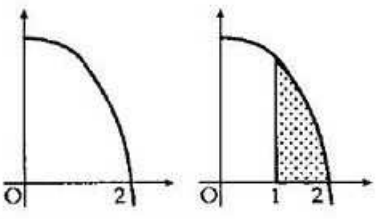- $\bullet^3$ $\frac{1}{2}u$
- $\bullet^4$ $-u^{-1}$
- $\bullet^5$ 1

3.

(a) Find the value of $\int_1^2 \left(4 - x^2 \right) dx$. **3**

(b) Sketch a graph and shade the area represented by the integral in (a). **2**

Part	Marks	Level	Calc.	Content	Answer	U2 OC2
(a)	3	C	NC	C15		1991 P1 Q16
(b)	2	C	NC	C16		

- $\bullet^1$ $4x$
- $\bullet^2$ $\frac{1}{3}x^3$
- $\bullet^3$ $1\frac{2}{3}$
- $\bullet^4$ for diagram 1 as shown
- $\bullet^5$ shading 1 to 2

4. Evaluate $\int_1^9 \dfrac{x+1}{\sqrt{x}}\,dx$. **5**

Part	Marks	Level	Calc.	Content	Answer	U2 OC2
	5	C	NC	C15		1992 P1 Q8

• ^{1} $x^{\frac{1}{2}}$ • ^{3} $\frac{2}{3}x^{\frac{3}{2}}$

• ^{2} $x^{-\frac{1}{2}}$ • ^{4} $2x^{\frac{1}{2}}$

                    • ^{5} $21\frac{1}{3}$

5. Find the value of $\int_1^4 \sqrt{x}\,dx$. **4**

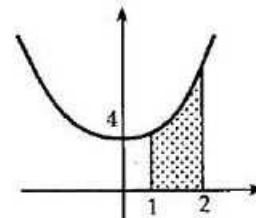| Part	Marks	Level	Calc.	Content	Answer	U2 OC2
	4	C	NC	C15		1997 P1 Q10

• ^{1} $x^{\frac{1}{2}}$

• ^{2} $x^{\frac{3}{2}} + \frac{3}{2}$

• ^{3} $\frac{2}{3}\left(4^{\frac{3}{2}} - 1^{\frac{3}{2}}\right)$

• ^{4} $\frac{14}{3}$

6. Evaluate $\int_1^2 \left(3x^2 + 4\right) dx$ and draw a sketch to illustrate the area represented by this integral. **5**

Part	Marks	Level	Calc.	Content	Answer	U2 OC2
	5	C	NC	C15, C16		1990 P1 Q6

• ^{1} x^3

• ^{2} $4x$

• ^{3} 11

• ^{4} sketch of parabola with min above origin

• ^{5} shade from 1 to 2

7. Evaluate $\int_{-3}^{0} \left(2x + 3\right)^2 dx$. **4**

Part	Marks	Level	Calc.	Content	Answer	U3 OC2
	4	C	NC	C22, C15		1996 P1 Q5

•¹ $\frac{1}{3}(2x+3)^3$

•² $+2$

•³ $\frac{1}{6}(3)^3 - \frac{1}{6}(-6+3)^3$

•⁴ 9

OR

•¹ $\frac{4}{3}x^3$

•² $6x^2 + 9x$

•³ $[0] - \left[\frac{4}{3}(-3)^3 + 6(-3)^2 + 9(-3)\right]$

•⁴ 9

[END OF QUESTIONS]