9.1 Revision

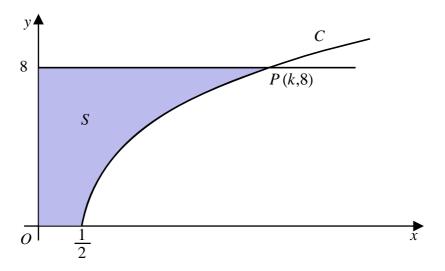
Show sufficient working to make your methods clear.

Marks Available: 40

Question 1

(a) Find $\int (2x-1)^{\frac{3}{2}} dx$ giving your answer in its simplest form.

[3 marks]



The sketch shows part of the curve C with equation $y = (2x - 1)^{\frac{3}{2}}$, $x \ge \frac{1}{2}$ which cuts the line y = 8 at point P with coordinates (k, 8), where k is a constant.

(**b**) Find the value of k

[2 marks]

(c) Find the shaded area, S, bounded by the coordinate axes, y = 8 and C.

Question 2

A-Level Examination Question from October 2021, Paper 2, Q12 (Edexcel)

(a) Use the substitution $u = 1 + \sqrt{x}$ to show that,

$$\int_0^{16} \frac{x}{1 + \sqrt{x}} \, dx \, = \, \int_p^q \, \frac{2 \, (\, u \, - \, 1\,)^3}{u} \, du$$

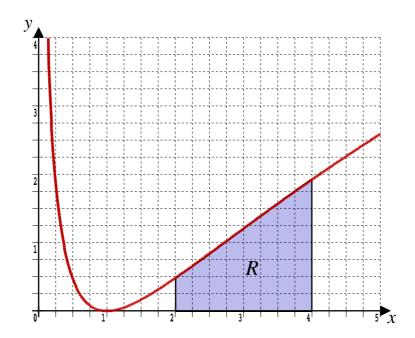
where p and q are constants to be found.

[3 marks]

(**b**) Hence show that, $\int_0^{16} \frac{x}{1 + \sqrt{x}} dx = A - B \ln 5$

where A and B are constants to be found.

Question 3A-Level Examination Question from October 2021, Paper 1, Q11 (Edexcel)



The graph shows part of the curve with equation, $y = (\ln x)^2$, x > 0. The finite region R, shown shaded, is bounded by the curve, the line with equation x = 2, the x-axis and the line with equation x = 4. The table below shows corresponding values of x and y, with the values of y given to 4 decimal places.

x	2	2.5	3	3.5	4
у	0.4805	0.8396	1.2069	1.5694	1.9218

(a) Use the trapezium rule, with all the values of y in the table, to obtain an estimate for the area of R. giving your answer to 3 significant figures.

(**b**) Use algebraic integration to find the exact area of *R*, giving your answer in the form,

$$y = a(\ln 2)^2 + b \ln 2 + c$$

where a, b and c are integers to be found.

[**5** marks]

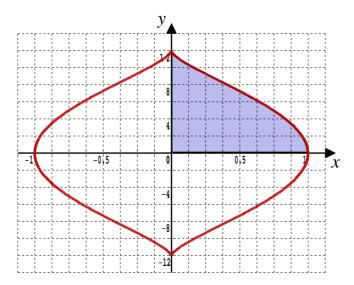
Question 4

A-Level Examination Question from October 2021, Paper 1, Q14 (Edexcel)

Given that
$$y = \frac{x-4}{2+\sqrt{x}}$$
, $x > 0$, show that $\frac{dy}{dx} = \frac{1}{A\sqrt{x}}$, $x > 0$

where *A* is a constant to be found.

Question 5



The graph is of the curve C with parametric equations,

$$x = \cos^3 \theta$$
, $y = 12 \sin \theta$, $0 \le \theta < 2\pi$

The finite region in the first quadrant, bounded by C and the coordinate axes, is shown shaded. The curve is symmetrical in both the x and the y axis.

(a) Show that the area of the shaded region is given by the integral,

$$36 \int_0^{\frac{\pi}{2}} \sin^2 \theta \cos^2 \theta \, d\theta$$

(b)	Use trigonometric identities to show that, $\cos^2\theta \sin^2\theta = \frac{1}{8} (1 - \cos 4\theta)$	
(c)	Hence find, in terms of π , the total area enclosed by C .	[4 marks]

[4 marks]