Areas & Volumes

Question Paper 1

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Integration
Sub Topic	Areas & Volumes
Booklet	Question Paper 1

Time Allowed: **56 minutes**

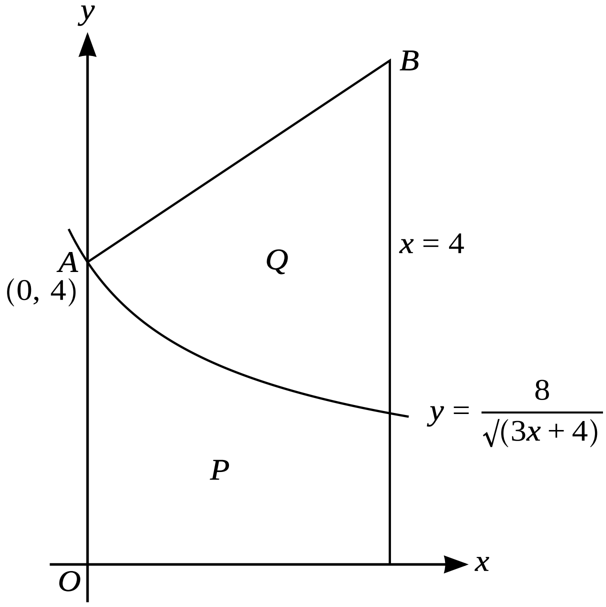
Score: **/46**

Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1



The diagram shows part of the curve $y = \dfrac{8}{\sqrt{(3x+4)}}$. The curve intersects the y-axis at $A\,(0, 4)$. The normal to the curve at A intersects the line $x = 4$ at the point B.

(i) Find the coordinates of B. [5]

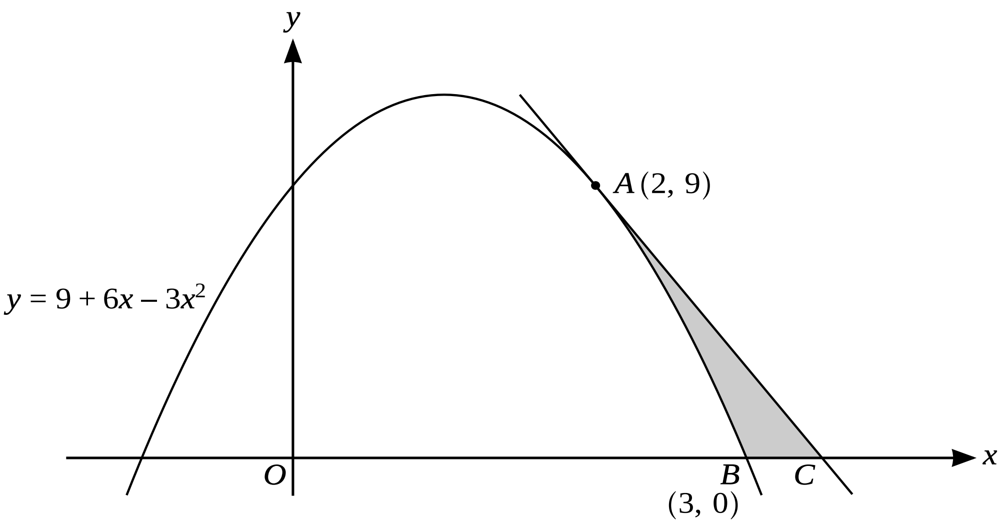
(ii) Show, with all necessary working, that the areas of the regions marked P and Q are equal. [6]

2 The equation of a curve is $y = \dfrac{4}{2x-1}$.

(i) Find, showing all necessary working, the volume obtained when the region bounded by the curve, the x-axis and the lines $x = 1$ and $x = 2$ is rotated through 360° about the x-axis. [4]

(ii) Given that the line $2y = x + c$ is a normal to the curve, find the possible values of the constant c. [6]

3

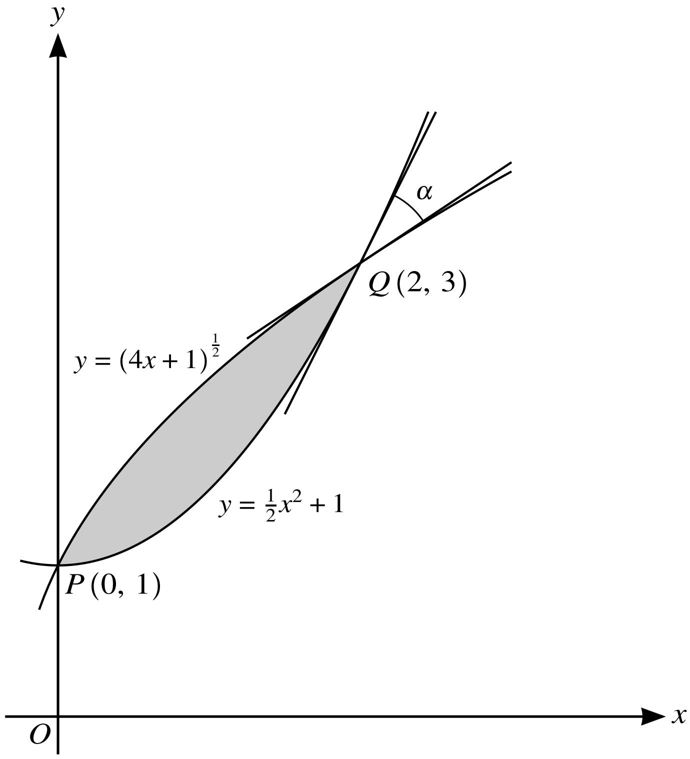


Points $A\,(2,\ 9)$ and $B\,(3,\ 0)$ lie on the curve $y = 9 + 6x - 3x^2$, as shown in the diagram. The tangent at A intersects the x-axis at C. Showing all necessary working,

(i) find the equation of the tangent AC and hence find the x-coordinate of C, [4]

(ii) find the area of the shaded region ABC. [5]

4

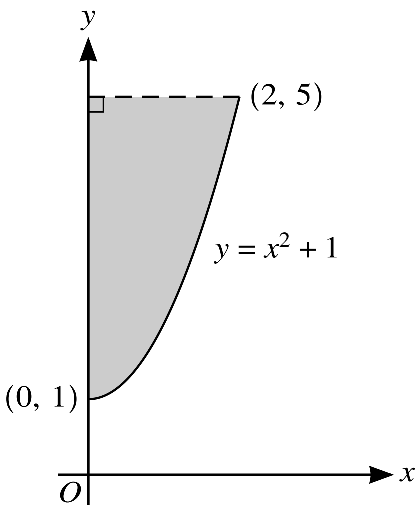


The diagram shows parts of the curves $y = (4x + 1)^{\frac{1}{2}}$ and $y = \frac{1}{2}x^2 + 1$ intersecting at points $P\,(0,\ 1)$ and $Q\,(2,\ 3)$. The angle between the tangents to the two curves at Q is α.

(i) Find α, giving your answer in degrees correct to 3 significant figures. [6]

(ii) Find by integration the area of the shaded region. [6]

5



The diagram shows part of the curve $y = x^2 + 1$. Find the volume obtained when the shaded region is rotated through 360° about the ***y*-axis**. [4]