

Areas & Volumes

Question Paper 2

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Integration
Sub Topic	Areas & Volumes
Booklet	Question Paper 2

Time Allowed: 60 minutes

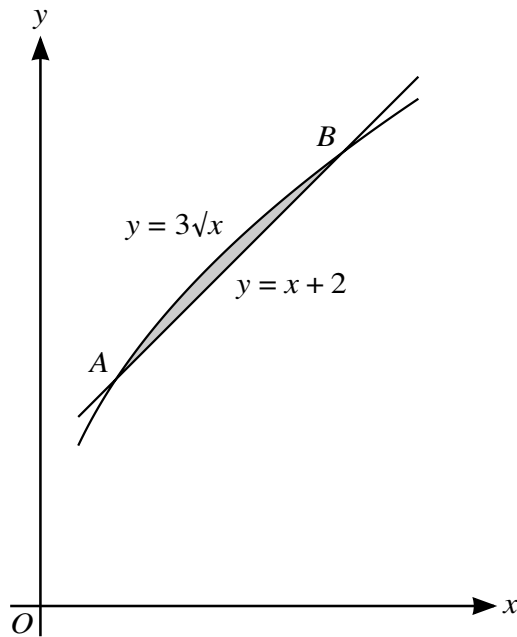
Score: /50

Percentage: /100

Grade Boundaries:

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

1



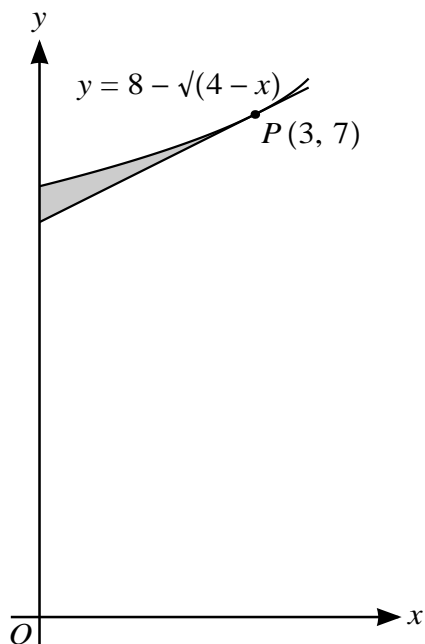
The diagram shows parts of the graphs of $y = x + 2$ and $y = 3\sqrt{x}$ intersecting at points A and B .

- (i) Write down an equation satisfied by the x -coordinates of A and B . Solve this equation and hence find the coordinates of A and B . [4]
- (ii) Find by integration the area of the shaded region. [6]

2 A line has equation $y = 2x + c$ and a curve has equation $y = 8 - 2x - x^2$.

- (i) For the case where the line is a tangent to the curve, find the value of the constant c . [3]
- (ii) For the case where $c = 11$, find the x -coordinates of the points of intersection of the line and the curve. Find also, by integration, the area of the region between the line and the curve. [7]

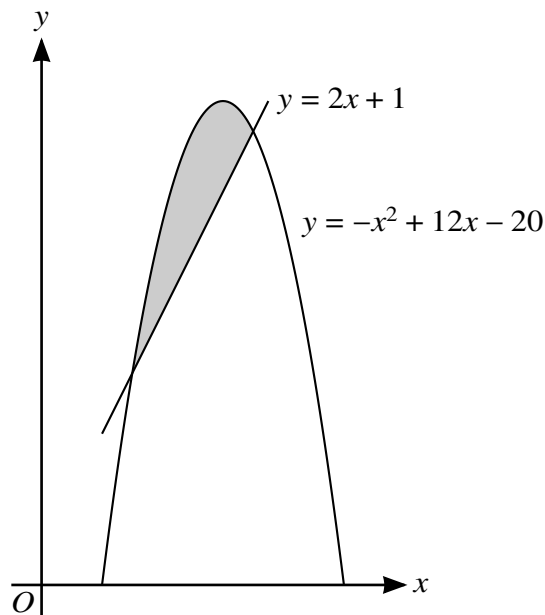
3



The diagram shows part of the curve $y = 8 - \sqrt{4 - x}$ and the tangent to the curve at $P(3, 7)$.

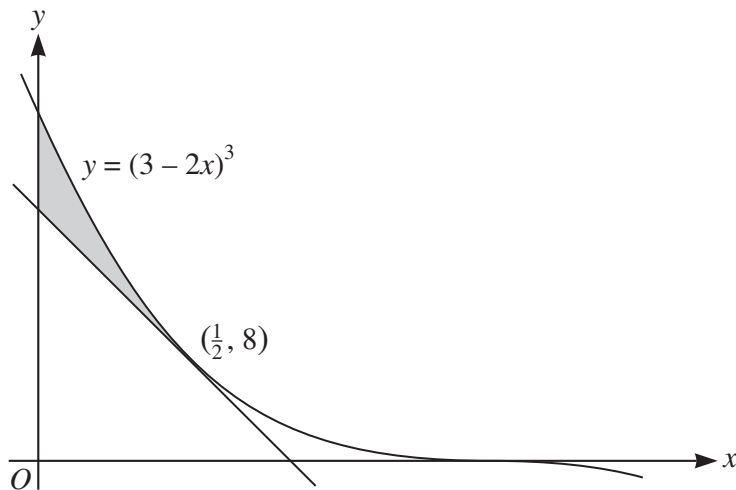
- (i) Find expressions for $\frac{dy}{dx}$ and $\int y \, dx$. [5]
- (ii) Find the equation of the tangent to the curve at P in the form $y = mx + c$. [2]
- (iii) Find, showing all necessary working, the area of the shaded region. [4]

4



The diagram shows the curve $y = -x^2 + 12x - 20$ and the line $y = 2x + 1$. Find, showing all necessary working, the area of the shaded region. [8]

5



The diagram shows the curve $y = (3 - 2x)^3$ and the tangent to the curve at the point $(\frac{1}{2}, 8)$.

(i) Find the equation of this tangent, giving your answer in the form $y = mx + c$. [5]

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