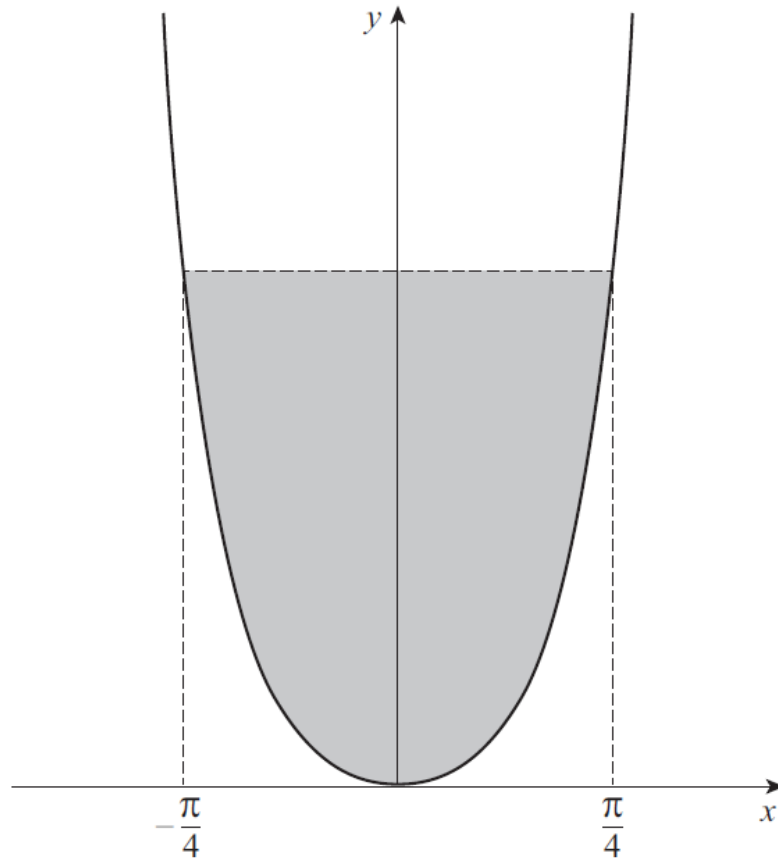


AQA – Integration – A2 Mathematics P1

1. June/2021/Paper_7357/1/No.10b

- (b) The region enclosed by the curve $y = \tan^2 x$ and the horizontal line, which intersects the curve at $x = -\frac{\pi}{4}$ and $x = \frac{\pi}{4}$, is shaded in the diagram below.



Show that the area of the shaded region is

$$\pi - 2$$

Fully justify your answer.

[5 marks]

2. June/2021/Paper_7357/1/No.11

A curve, C , passes through the point with coordinates $(1, 6)$

The gradient of C is given by

$$\frac{dy}{dx} = \frac{1}{6}(xy)^2$$

Show that C intersects the coordinate axes at exactly one point and state the coordinates of this point.

Fully justify your answer.

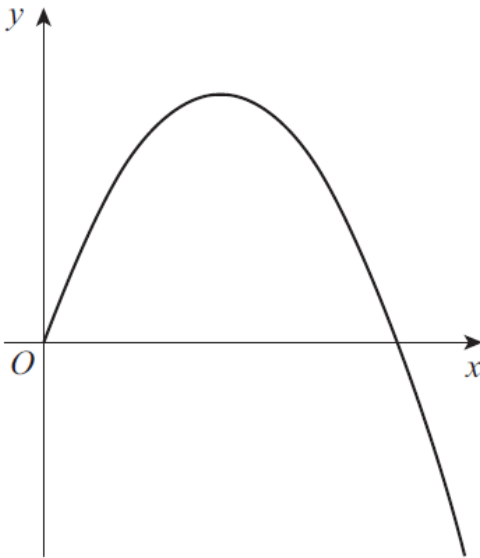
[8 marks]

3. June/2021/Paper_7357/1/No.14

The curve C is defined for $t \geq 0$ by the parametric equations

$$x = t^2 + t \quad \text{and} \quad y = 4t^2 - t^3$$

C is shown in the diagram below.



- (a) Find the gradient of C at the point where it intersects the positive x -axis.

[5 marks]

(b) (i) The area A enclosed between C and the x -axis is given by

$$A = \int_0^b y \, dx$$

Find the value of b .

[1 mark]

(b) (ii) Use the substitution $y = 4t^2 - t^3$ to show that

$$A = \int_0^4 (4t^2 + 7t^3 - 2t^4) \, dt$$

[3 marks]

(b) (iii) Find the value of A .

[1 mark]