

10.

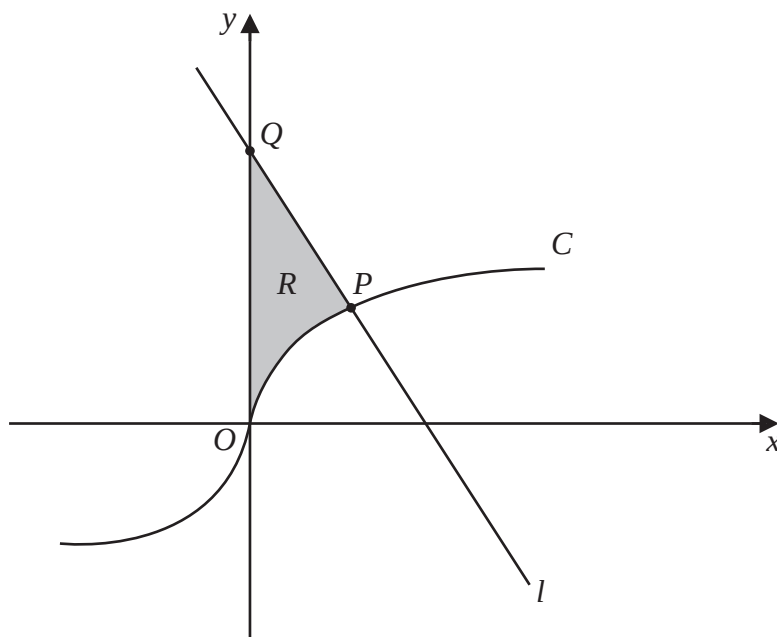


Figure 3

**In this question you must show all stages of your working.
Solutions relying entirely on calculator technology are not acceptable.**

Figure 3 shows a sketch of part of the curve C with equation

$$y = \frac{7x}{\sqrt{3x^2 + 4}}$$

The point P lies on C and has x coordinate 2

The line l , also shown in Figure 3, is the normal to C at P .

(a) Use calculus to find an equation for l .

Give the answer in the form $ax + by + c = 0$, where a , b and c are integers.

(5)

The line l intersects the y -axis at the point Q .

(b) Write down the exact y coordinate of Q .

(1)

The region R , shown shaded in Figure 3, is bounded by C , l and the y -axis.

(c) Use algebraic integration to find the exact area of R .

(5)