

11.

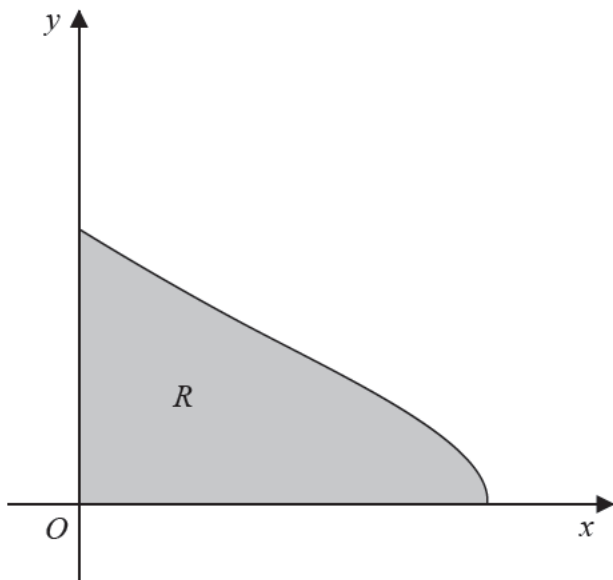


Figure 5

Figure 5 shows a sketch of the curve with parametric equations

$$x = 3 \cos 2t, \quad y = 2 \tan t \quad 0 \leq t \leq \frac{\pi}{4}$$

The region R , shown shaded in Figure 5, is bounded by the curve, the x -axis and the y -axis.

(a) Show that the area of R is given by

$$\int_0^{\frac{\pi}{4}} 24 \sin^2 t \, dt \tag{4}$$

(b) Hence, using algebraic integration, find the exact area of R .

(3)