



The diagram shows the curve C with parametric equations

$$x = \frac{3}{t}, \quad y = t^3 e^{-2t}, \quad \text{where } t > 0.$$

The maximum point on C is denoted by P .

(a) Determine the exact coordinates of P .

[4]

The shaded region R is enclosed by the curve, the x -axis and the lines $x = 1$ and $x = 6$.

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

$$\int_a^b 3te^{-2t} dt,$$

where a and b are constants to be determined.

[3]

(c) Hence determine the exact area of R .

[5]