9.

Figure 3

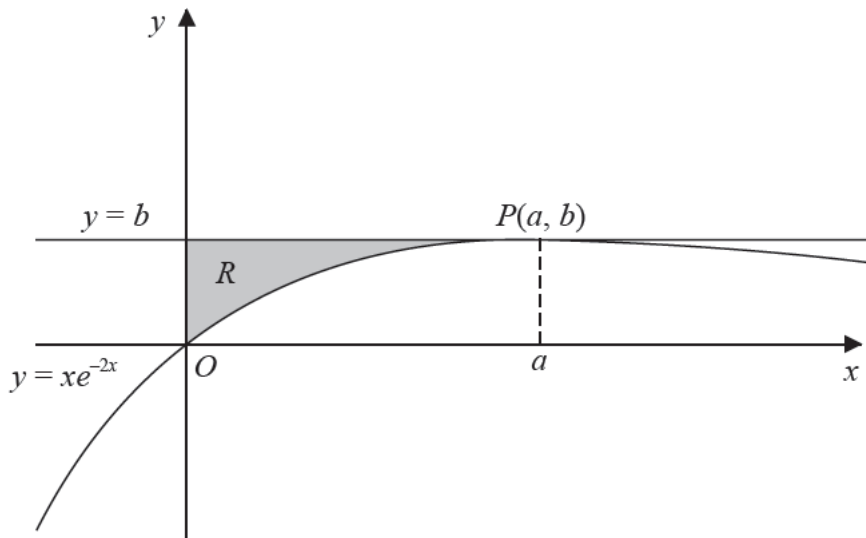**In this question you must show all stages of your working.**

Solutions relying on calculator technology are not acceptable.

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

$$y = xe^{-2x}$$

The point $P(a, b)$ is the turning point of the curve.

(a) Find the value of a and the exact value of b

(4)

The finite region R, shown shaded in Figure 3, is bounded by the curve, the line with equation $y = b$ and the y-axis.

(b) Find the exact area of R.

(5)