

14 Jan 07



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6. (a) Given that $y = 2^x$, and using the result $2^x = e^{x \ln 2}$, or otherwise, show that $\frac{dy}{dx} = 2^x \ln 2$.

(2)

(b) Find the gradient of the curve with equation $y = 2^{(x^2)}$ at the point with coordinates (2,16).

(4)

Handwritten solution area with horizontal lines for working.



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- $$I = 16 - 16(0.5)^t, \quad t \geq 0$$

Give your answer in the form $\ln a$, where a is a constant.

(5)



June 2010

3. A curve C has equation

$$2^x + y^2 = 2xy$$

Find the exact value of $\frac{dy}{dx}$ at the point on C with coordinates $(3, 2)$.

(7)

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5.

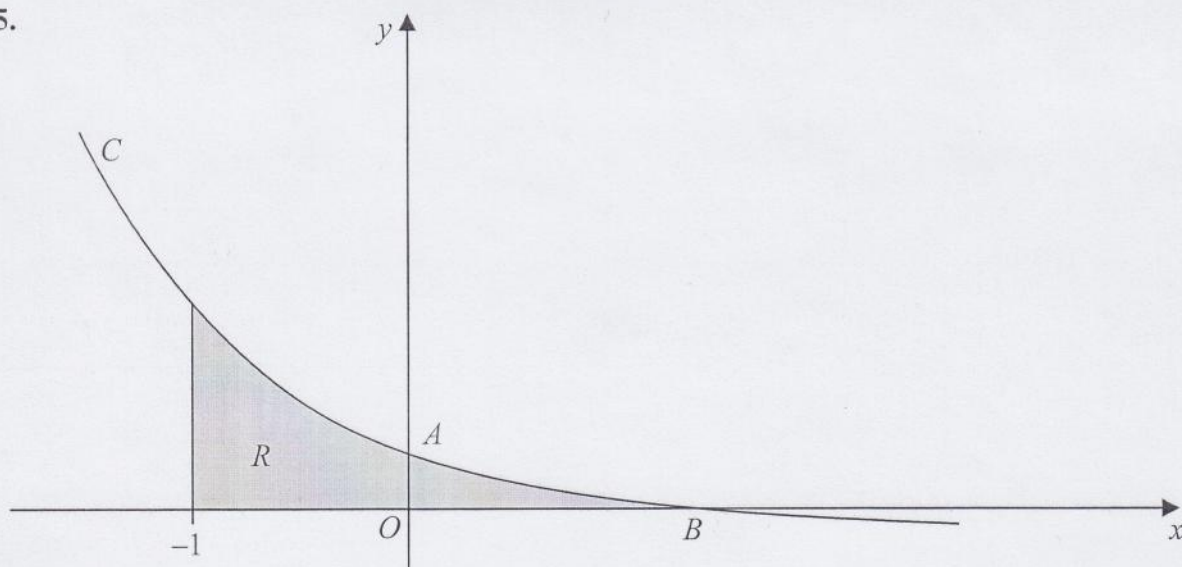


Figure 2

Figure 2 shows a sketch of part of the curve C with parametric equations

$$x = 1 - \frac{1}{2}t, \quad y = 2^t - 1$$

The curve crosses the y -axis at the point A and crosses the x -axis at the point B .

(a) Show that A has coordinates $(0, 3)$. (2)

(b) Find the x coordinate of the point B . (2)

(c) Find an equation of the normal to C at the point A . (5)

The region R , as shown shaded in Figure 2, is bounded by the curve C , the line $x = -1$ and the x -axis.

(d) Use integration to find the exact area of R . (6)

